



SATURDAY, JANUARY 10, 1874.

## Rodes' Rail Joint.

The accompanying engravings represent a rail-joint which is intended to accomplish what has been aimed at by the inventors of compound rails—that is, to make the bearing for the wheels continuous at the junction of the rails. The nature of this invention will be readily understood from the engravings. Fig. 1 is a perspective view and fig. 2 a transverse section. In fig. 2 a represents a section of the rail with one side of the head cut away for a distance, *c*, *b* (fig. 1), from each end, equal to half the length of the fish-plate *B*. The top of this plate has the same section as the rail when the head is cut away as described; consequently it affords a bearing at the junction of the rails, as shown in the engraving. This, of course, prevents the concussion which is experienced in all other joints when the rail is not continuous, no matter how carefully they are made or maintained, and which must, therefore, result in great saving of wear to rolling stock. On the opposite side of the rail is another plate, *C*, which supports the rail under the head at *d*. Both these plates embrace the rail under the base, as shown in fig. 2. They are held by the ordinary fish-bolts as represented. This joint seems to possess a good deal of merit, provided its expense is not too great to prevent its being used. The inventor is Mr. Tyree Rodes, of Pulaski, Tenn., who will make liberal arrangements with parties desiring to use his invention.

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## CATECHISM OF THE LOCOMOTIVE.

## THE FORCES OF AIR AND STEAM.

QUESTION 6. What is meant by the pressure of the air?

Answer. It is the pressure exerted by the weight of the air on every point with which it is in contact. The globe of the earth is surrounded by a layer of air about 50 miles thick, and like every other substance, the air possesses weight, and hence presses upon every object with which it is in contact.

QUESTION 7. How can it be shown that the air possesses weight?

Answer. By weighing a flask when it is filled with air, and again when the air is exhausted from it. In the latter condition the weight of the flask will be found to be sensibly less than it was when full of air, showing that the air which the flask contained when it was first weighed increased its weight.

QUESTION 8. Why do we not feel this pressure on our bodies?

Answer. Because the air surrounds us on all sides, and presses just as much in one direction as it does in another, so that the pressure in different directions just balance each other, or are in equilibrium; but if you disturb this balance, for example, by sucking the air from a tube closed at one end, it will cling to your tongue; or if you take a thick piece of leather under ordinary conditions it will not adhere to anything, but if it be thoroughly wet and pressed hard against the surface of a smooth stone, so as to force out the air from under it, the stone, as nearly all school-boys know, can be lifted up if a string is attached to the leather; or if the air be sucked out of a tube, one end of which is inserted in a liquid, the latter will be forced up the tube. These phenomena are due to the pressure of the atmosphere in the first case on one side of the person's tongue, pressing it against the mouth of the tube; in the second, to the same pressure on the top of the leather, causing it to adhere to the stone; and in the last, to the weight of the air pressing on the surface of the liquid, forcing it into the vacuum in the tube.

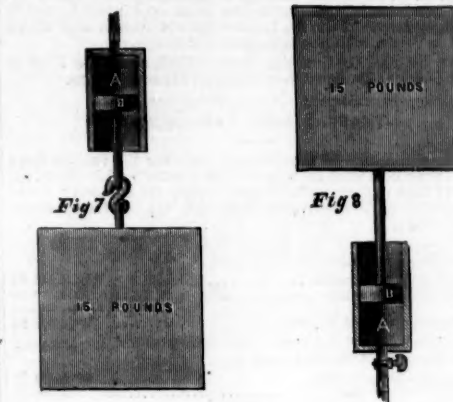
QUESTION 9. What is the amount of the pressure of the atmosphere, and how is it measured?

Answer. It is usually measured by the pressure on one square inch of surface, which at the earth's surface is 14.7 pounds.\* If, for example, we have a cylinder, *A*, fig. 7, with an air-tight piston, *B*, fitted to it whose area is just one square inch, if we exhaust the air through the tube *C* from the cylinder above the piston, the air will press against the under side of the piston so that, if no power is required to overcome its friction in the cylinder, the pressure of the air will raise a weight of 14.7 pounds. The pressure of the air varies, however, as you ascend or descend from the surface of the earth, because as you go up on a mountain or in a balloon the layer of air above you becomes thinner and therefore its weight and consequent pressure are diminished; and as you descend as in a deep mine, the layer is thicker, and its pressure consequently greater.

QUESTION 10. What is steam?

Answer. Steam is water changed by means of heat into a gas. At every temperature there is formed from water on its surface, vapor of which the clouds are formed at all seasons of the year. This change of water into vapor, or evaporation of water, takes place at low temperatures only on its surface, however. On the contrary, if we heat water in a vessel to a temperature of 212 degrees Fahrenheit, then the inner particles of the mass of water (lying on the heating surface of the vessel) are changed into steam, and rise to the surface in bubbles, which is the phenomenon we call boiling. It must not be imagined, however, that the visible cloud which escapes from a kettle or the exhaust-pipe of a steam engine is true steam: It

is rather small particles of water, into which the steam has condensed through contact with the cold air. True steam is invisible, as we may observe near the mouth of a kettle or the exhaust-pipe of an engine from which we know it is escaping.



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QUESTION 11. If water is heated in an open vessel what occurs?

Answer. It continues for some time to increase in temperature, and the evaporation becomes more and more rapid. At length bubbles of vapor break out and reach the surface,

FIG. 1

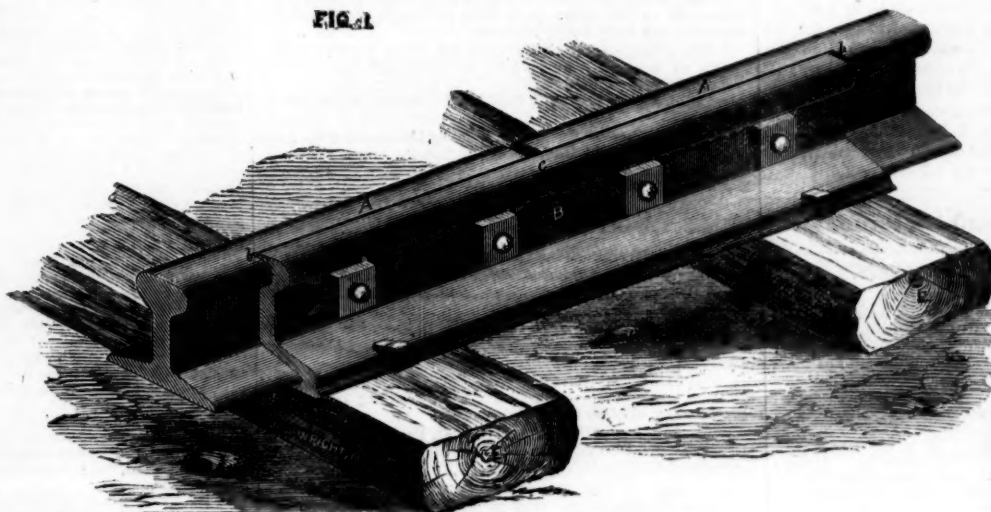
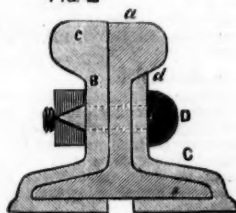


FIG. 2



and the process of boiling or ebullition has begun. When this takes place the temperature of the water ceases to rise, and it remains stationary until all the water has boiled away, the only difference being that if the supply of heat be very great the process is very rapid, and if the supply of heat be small the process is very slow. The point at which ebullition commences is called the boiling-point.

QUESTION 12. On what does the boiling-point depend?

Answer. Chiefly on the pressure on the surface of the water, but to some extent upon the purity of the water. Thus, boiling, which takes place at 212 degrees under the ordinary atmospheric pressure, in lighter air, as on high mountains, takes place at a much lower temperature than on lowlands, and so water boils in a glass tube from which the air has been exhausted by the warmth of the hand, that is, at 92 degrees.

QUESTION 13. What is the pressure of steam which escapes from boiling water in an open vessel?

Answer. It is exactly equal to the pressure of the atmosphere in which it is boiled. Ordinarily this is 14.7 lbs., and the boiling-point 212 degrees, but if we go up on a mountain where the atmospheric pressure is only 10 lbs. per square inch, the water will then boil at a temperature of 193.3 degrees, and the steam which escapes will have the same pressure as the atmosphere, or 10 lbs. per square inch. On the other hand, if we could go down into a mine where the atmospheric pressure was 20 lbs. per square inch, the water would not boil until it was heated to 228 degrees, and the pressure of the escaping steam would then also be 20 lbs. per square inch.

QUESTION 14. If water is boiled in an enclosed vessel like a covered tea kettle or a steam boiler, what occurs?

Answer. The steam rises and fills the space above the water and, if it cannot escape, increases in pressure. The temperature of both the water and the steam rises with the pressure, and will continue to do so as long as the heat is increased or until the steam can escape or the vessel is exploded. The boiling-point also rises as the steam pressure increases.

QUESTION 15. Is there any pressure which corresponds to the temperature of steam and water?

Answer. Yes. There is a fixed pressure for every temperature, and when steam is in contact with water its pressure cannot be increased or diminished without at the same time heating or cooling the water, and the higher the temperature of the water the greater will be the corresponding steam pressure. Thus water at 212 degrees produces steam with a pressure equal to that of the atmosphere; at 240 degrees the steam will have a pressure of 25 lbs., or 10 lbs. more than the atmospheric pressure; at 281 degrees, a pressure of 50 lbs.; and at 328 degrees, 100 lbs. As this relation of pressure to temperature is fixed, if we know the one we can tell the other. This is true, however, only where the steam is in contact with water when it is called saturated steam. If it is separated from water it may be heated to a higher temperature, and is then called superheated steam.

QUESTION 16. How is the pressure of steam measured?

Answer. In the same way as that of the atmosphere—that is, by the force exerted on one square inch of surface. Thus if steam is admitted into the cylinder *A*, fig. 8, under the piston *B*, whose area is equal to one square inch of surface, supposing, as we did before, that no power is required to overcome its friction in the cylinder, if the steam thus admitted would just balance the atmosphere, its pressure would be equal to 15 lbs. If, besides overcoming the pressure of the atmosphere, it would raise a weight of 15 lbs., then its pressure per square inch would be equal to 30 lbs. When the atmospheric pressure is included with that of the steam, we call it the absolute steam pressure. In ordinary engines, however, the steam must always overcome the pressure of the atmosphere, and therefore the only part of the pressure which is effective is that above,

or by which it exceeds, the atmospheric pressure. For example, although the steam admitted under the piston in fig. 8 has an absolute pressure of 30 lbs. per square inch, yet it will only raise a weight of 15 lbs., because it must first overcome the pressure of the air on the other side of the piston. The pressure of the steam used in most stationary and in locomotive engines is, therefore, measured by its pressure above the atmosphere. That is, if steam introduced under the piston in fig. 8 will raise a weight of only 15 lbs., we say it has a pressure of 15 lbs. per square inch; if it will raise 50 lbs., its pressure is said to be 50 lbs. per square inch, and so on. The pressure of the atmosphere is disregarded, and all steam-gauges used on locomotives are graduated in that way. In speaking of steam

pressure in future, therefore, we will mean effective and not absolute pressure.

[TO BE CONTINUED.]

## Contributions.

## Long Runs.

[The following letters, received some weeks ago, have not been published earlier for want of room:]

AURORA, Ill., November 10, 1873.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of November 1, on page 439, "Company" pitches into Engine 160 of the Chicago, Burlington & Quincy Railroad rough-shod because she did not run as far as 231 on the Little Miami division of the Pittsburgh, Cincinnati & St. Louis Railway. I think there were good reasons for it; in the first place, Engine 160 is not a passenger engine and is therefore not to be compared with that class, but is a freight engine with 16 by 24 inch cylinder and 4 ft. 1 inch wheels, and weighs 31 tons and is hauling heavy trains—40 loaded cars eastward and 45 to 60 empty cars westward. In the second place, she has run that for two years and seven months after coming direct from the builders' shops, and all engineers know that a new engine from the builders' shops is not as good as one from the company's shops. In that time she never had valves faced, making the round trip with one pint of tallow (how much did "Joe" use?) and two pints of black oil for machinery. There was no mileage allowed for switching in that time, whereas she ought to have had an allowance of 3,100 miles for switching. Her machinery was good to run one year more, but her flues would not hold out.

MARK MCGLINT, Engineer of Engine 160.

P. S. I don't take no back seat, "Joe" or "Company" either.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The article by H. J. McKenna in the GAZETTE of November 29, on "long runs" would lead one to infer that his idea of "general repairs" was centered in the turning of the drivers



Why not have it in the renewing of the engine truck or tender wheels? He would then be able to give his engines "general repairs" often, and with a greater show of consistency; for it costs more to renew a set of truck or tender wheels than it does to turn the tire of an engine; both, however, should be done whenever needed in order to gain strength for long runs.

The idea of running tires until there is a flange on both sides for the sake of seeing how long they will run, is done at the expense of greatly increased wear on the engine, frogs, switches, and the destruction of the track generally, and should never be tolerated when it can be avoided. "Company" should have stated in his article that 231 had, in the meantime, had tires turned and valves faced, but had run a sufficient number of miles before and after to make up for the time lost, and bring the total mileage in three years up to 134,103 miles.

#### "Go Thou and Do Likewise."

The following letter is very encouraging to us, as it indicates that we have had at least one reader who has practised what we have preached. Like most other preachers, we fear we have often been rather tiresome at times, but we feel sure, however, that our readers will excuse us for being so, if our sermons will only induce others to ventilate their cars as our correspondent says he is ventilating his. The credit for the suggestion of ventilating cars by opening the end windows and closing the blinds is due to Mr. Lewis W. Leeds, and not to us. As stated in a previous number of our paper, he will address the Master Car-Builders' Association on the subject of ventilation at its next monthly meeting, which will be held at its rooms, No. 113 Liberty street, New York, on the 15th of January, at 5 o'clock P. M.:

RICHMOND, Va., December 16, 1873.

TO THE EDITOR OF THE RAILROAD GAZETTE:

An attentive reader of your valuable paper cannot fail to be impressed with the importance of proper ventilation in passenger cars. Yet little is done towards it.

About two years ago the suggestion was made in your columns that the simplest and surest way to provide for the ingress of fresh air was to raise the end window next to the stove, and let down the blind. We at once adopted it, and have adhered to it ever since, with the best results. We also use thermometers to regulate the temperature of the cars.

EDWD. T. D. MYERS,

General Superintendent,

Richmond, Fredericksburg & Potomac Railroad.

### General Railroad News.

#### ELECTIONS AND APPOINTMENTS.

—Mr. William Greene, heretofore General Superintendent, has been appointed General Manager of the Burlington, Cedar Rapids & Minnesota Railroad. Mr. W. W. Walker, formerly Superintendent of the Sioux City & Pacific Railroad, has been appointed General Superintendent of the Burlington, Cedar Rapids & Minnesota.

—Mr. S. H. Melvin, President, George H. Black, Secretary, and John Williams, a director of the Gilman, Clinton & Springfield Railroad Company, have resigned. At a meeting of the board of directors held in Springfield, December 31, T. J. Carter and B. F. Fox, of Springfield, Ill., and Henry Hanks, of Clinton, Ill., were chosen to fill the vacancies in the board. T. J. Carter was elected President.

—The directors of the Southern & Atlantic Telegraph Company have chosen the following officers for the ensuing year: President, James B. Crenshaw; Vice-President, Charles W. Blossom; Secretary and Treasurer, W. R. Gardner; General Superintendent, George H. Grace.

—Mr. H. N. Titus, of New York, was chosen Vice-President of the Jacksonville Northwestern & Southeastern Railroad Company at a meeting of the directors held in Jacksonville, Ill., January 2.

—Mr. John W. Mass is appointed General Ticket Agent of the St. Louis & Southeastern Railway in place of W. B. Davenport, who has resigned. Mr. Chauncey H. Crosby is appointed Assistant General Freight Agent, and all communications regarding transportation of freight must be addressed to him at St. Louis, Mo.

—At the annual meeting of the Frankfort & Kokomo Railroad Company in Frankfort, Ind., January 1, the following directors were elected for the ensuing year: Coe Adams, Daniel E. Comstock, E. Y. Comstock, Brooklyn, N. Y.; H. Y. Morrison, R. G. Bonfield, J. N. Davis, John G. Clark, Frankfort, Ind.; John M. Leach, Kokomo, Ind.; A. G. Wells, C. Cowgill, Wabash, Ind.; W. M. Waters, William Hart, Russville, Ind.; Ransom Gardner, Kalamazoo, Mich. The officers elected were as follows: President, Coe Adams; Vice-President, H. Y. Morrison; Secretary, Daniel E. Comstock; Treasurer, John M. Leach; Assistant Treasurer, R. G. Bonfield; General Manager, A. G. Wells; Superintendent, E. Y. Comstock; Counsellor, C. Cowgill.

—The following are the officers of the St. Louis, Lawrence & Western Railroad Company, formed by the consolidation of the St. Louis, Lawrence & Denver and the Lawrence & Southwestern companies: President, J. P. Usher; Vice-President and Manager, J. M. Webster; Treasurer, J. W. McMillan; Secretary, O. E. Leamard; Auditor, E. C. Devereux.

—At the annual meeting of the Union Railway Company in Boston, December 29, K. S. Chaffee, S. B. Rindge, James C. Fisk, George P. Carter, Edwin Dresser, Joseph H. Converse, James W. Emery, H. H. Stimpson, William A. Saunders and Estes Howe were chosen directors. Knowlton S. Chaffee was re-elected President and Frederick T. Stevens was chosen Secretary and Treasurer in place of Estes Howe, who declined re-election.

—At the annual meeting of the Mount Carbon & Port Carbon Railroad, the Mill Creek & Mine Hill Navigation & Railroad and the Schuylkill Valley Navigation & Railroad companies, December 29, the following board of directors was chosen for all three companies: John Tucker, P. B. Gowen, A. E. Borie, H. P. McKean, R. B. Caborn, A. Hewson, George F. Tyler, John Tucker was re-elected President and P. C. Hollis Secretary and Treasurer. The companies' roads are leased by the Philadelphia & Reading Company.

—Daniel R. Williams has been re-elected President and

Daniel A. Kimball Treasurer of the Stockbridge & Pittsfield Railroad Company, whose road is leased to the Housatonic Company.

—Mr. Zion, of Boon County, Ind., formerly Vice-President, has been chosen President of the Anderson, Lebanon & St. Louis Railroad Company, in place of Thomas W. Stillwell, who has resigned.

—Mr. George Clarke, late Train Dispatcher on the Pittsburgh, Cincinnati & St. Louis, and formerly on the Philadelphia & Erie, has been appointed Special Agent for Mr. George Webb, Assistant General Manager of the Pittsburgh, Cincinnati & St. Louis.

—Mr. H. D. Judd, late General Traveling Agent of the Rockford, Rock Island & St. Louis, has been appointed Northern Passenger Agent of the St. Louis & Iron Mountain and Cairo & Fulton roads, with headquarters at Chicago.

—Mr. George C. Kimball, Superintendent of the Flint & Pere Marquette Railroad, has tendered his resignation.

#### TRAFFIC AND EARNINGS.

—The shipments of Cumberland coal over the various lines for the year 1873 were as follows: Baltimore & Ohio Railroad, 1,679,617 tons; Chesapeake & Ohio Canal, 779,413 tons; Bedford Division, Pennsylvania Railroad, 114,589 tons; total, 2,573,619 tons.

—The earnings of the Boston & Lowell Railroad for the year ending September 30, 1873, were:

Earnings (\$20,346 per mile).....	\$1,464,941 85
Expenses (65% per cent.).....	974,289 00

Net earnings (\$6,815 per mile)..... \$490,652 85

—The earnings of the Providence & Worcester, for the year ending September 30, 1873, were:

Earnings (\$20,225 per mile).....	\$970,809 52
Expenses (73% per cent.).....	713,706 17

Net earnings (\$5,356 per mile)..... \$257,103 35

—The receipts of coal at East St. Louis by the various lines for the year 1873 were as follows: Belleville & Southern Illinois, 9,240,146 bushels, or 39,069 car-loads; Ohio & Mississippi, 4,530,872 bushels, or 15,571 car-loads; Illinois & St. Louis, 4,024,390 bushels, or 14,628 car-loads; Vandalia Line, 3,886,060 bushels, or 12,730 car-loads; St. Louis & Southeastern, 2,924,389 bushels, or 9,914 car-loads; total, 24,505,857 bushels (280,235 tons of 2,000 pounds), or 85,912 car-loads. This would make 2,800 trains. In addition to this, the Cairo & St. Louis road delivered during the last five months of the year 237,800 bushels, or 1,189 car-loads of coal from the Big Muddy coal fields.

—The earnings of the Chicago & Northwestern Railway for the month of December were: 1873, \$1,019,502; 1872, \$859,780; increase, \$159,722, or 18% per cent.

—The earnings of the Milwaukee & St. Paul Railway for the month of December were: 1893, \$843,200; 1872, \$513,787; increase, \$329,413, or 64% per cent. For the year the earnings were: 1873, \$9,046,151; 1872, \$6,957,771; increase, \$2,088,380, or 30 per cent.

—The earnings of the Warwick Valley Railroad for the year ending September 30, 1873, were:

Earnings (\$5,000 per mile).....	\$50,000 79
Expenses (66% per cent.).....	33,395 69

Net earnings (\$1,660 per mile)..... \$16,605 10

Dividends, 7 per cent..... 15,750 00

Surplus..... \$ 855 10

—The earnings of the Great Western Railway of Canada for the week ending December 12 were: 1873, £23,508; 1872, £24,231; decrease, £723, or 3 per cent.

—The earnings of the Grand Trunk Railway for the week ending December 13 were: 1873, £40,300; 1872, £36,900; increase, £3,400, or 9% per cent.

—The earnings of the Chicago & Northwestern Railway for the third week in December were: 1873, \$238,786; 1872, \$212,942; increase, \$25,844, or 12% per cent.

—The earnings of the Milwaukee & St. Paul Railway for the third week in December were: 1873, \$190,600; 1872, \$120,856; increase, \$69,744, or 57% per cent.

#### CHICAGO RAILROAD NEWS.

##### Illinois Central.

The through fare from Chicago to New Orleans, by the new route, has been reduced from \$34.75 for first-class fare to \$33, and for second-class passengers from \$27.70 to \$25, with emigrant rates at \$18.25.

##### Gilman, Clinton & Springfield.

A motion was made to oust Receiver Hinckley on behalf of the new directory, before Judge Tipton, of McLean County. The Judge declined to grant the petition on the ground that the Morgan Improvement Company still had a majority in the board, and could elect directors at will. Receiver Hinckley therefore will remain in office as Receiver, until it shall be known who holds the bona fide stock of the company.

##### Chicago & Paducah.

Track has been laid on this road to a point about fifteen miles south of Windsor, and work will not for the present be prosecuted further, not before Spring at least.

##### Traffic.

Railroad business in general is dull yet, though looking up on several of the roads. Passenger business everywhere is dull. Freight from the west and northwest continue unexpectedly good. Hogs and grain are arriving in large quantities, and railroad men are looking for a decided revival in passenger business very soon.

##### Chicago, Burlington & Quincy.

President Walker has addressed a letter to a committee appointed at a recent meeting of citizens at Burlington, Iowa, when charges were made that the agreements made by the city of Burlington with the Chicago, Burlington & Quincy and Burlington & Missouri River companies had not been carried out in good faith. Mr. Walker states that the companies have not only carried out these agreements, but have done much more for the city than was required by them. He also states that there is no intention of removing the shops from Burlington, and that the principal shops of all the Iowa lines will be retained there.

#### OLD AND NEW ROADS.

##### Dividends.

The regular semi-annual dividends of 4% per cent. on the stock of the Paterson & Hudson River, and 4 per cent. on the stock of the Paterson & Ramapo Railroad Company, whose roads are leased by the Erie, was paid January 5.

The regular semi-annual dividend of 4% per cent. on the stock of the Cayuga & Susquehanna Railroad Company was paid by the Delaware, Lackawanna & Western Company, lessee, January 2.

The Boston & Lowell Railroad Company paid the usual semi-annual dividend of 4 per cent., January 1.

The usual semi-annual dividend of 3% per cent. on the stock of the Concord & Portsmouth Railroad Company was paid by the Concord Railroad Company, lessee, January 1.

The Connecticut River Railroad Company paid a semi-annual dividend of 5 per cent., January 1.

The Fitchburg Railroad Company paid a semi-annual dividend of 4 per cent., January 1.

The Norwich & Worcester Railroad Company, whose road is leased to the New York & New England Company, will pay the usual semi-annual dividend of 5 per cent., January 12.

The Old Colony Railroad Company paid a semi-annual dividend of 2% per cent., January 1.

The Providence & Worcester Railroad Company paid a semi-annual dividend of 5 per cent., January 1.

The Worcester & Nashua Railroad Company paid a semi-annual dividend of \$5 per share, January 1.

The Taunton Branch Railroad Company paid a semi-annual dividend of 5 per cent., January 1.

The Housatonic Railroad Company, lessee, pays the usual quarterly dividend of 1% per cent. on the stock of the Berkshire Railroad Company, January 10.

The Boston & Albany Railroad Company, lessee, paid the usual semi-annual dividend of 3 per cent. on Pittsfield & North Adams stock, January 1.

The Eastern Railroad Company, lessee, paid the usual semi-annual dividend of 5 per cent. on the stock of the Portland, Saco & Portsmouth Railroad Company January 1, but passed the January dividend on its own stock and that of its New Hampshire leased lines, the Eastern of New Hampshire and the Portsmouth, Great Falls & Conway.

The regular semi-annual dividend of 4 per cent. on the stock of the Chicago, Iowa & Nebraska Railroad Company, whose road is leased to the Chicago & Northwestern, was paid January 1.

The Warwick Valley Railroad Company paid a semi-annual dividend of 3% per cent. January 1. The road is operated under contract by the Erie.

#### Illinois & St. Louis Bridge.

J. S. Morgan & Co. offered in London on the 20th of December £400,000, or \$2,000,000 gold, of 7 per cent. second-mortgage bonds at the price of £160 per bond of £200, or 80 per cent. of their face. The bonds run till 1901.

This makes the capital account of the company \$10,000,000, there being \$4,000,000 of first-mortgage bonds, this \$2,000,000 of second-mortgage bonds, and \$4,000,000 of stock, all the latter except \$230,000 being reported paid in full. The costly tunnel which will connect the west end of the bridge with the St. Louis Railroad west of the Mississippi is not the property of the bridge company, but is being constructed by another corporation. In the advertisement of this issue of bonds is published an estimate of the receipts of the bridge by the Chief Engineer, Capt. James B. Eads. This estimate gives the tolls as 40 cents per ton for merchandise and 33% cents for coal, and takes one-third the total amount of tonnage received and shipped at St. Louis in 1872 as the amount that will cross the bridge. The passenger toll is given as 20 cents, with 600 passengers daily. This would make the railroad traffic produce about \$1,170,000, and the highway traffic is roughly estimated at \$300,000. This would give gross receipts of \$1,470,000 currency, and the expenses are estimated at \$100,000. By this estimate the net earnings will be about \$740,000 more than the interest charge, which will be sufficient for a dividend of 18% per cent. on the stock.

#### Central Pacific.

The financial agents, Messrs. Fisk & Hatch, have issued a circular to bondholders respecting the present condition of the company and its business for the year just ended. The gross earnings (December estimated) for 1873 were \$13,871,089.82; the expenses (estimated for November and December), \$5,589,446.15; leaving net earnings of \$8,281,643.67. The annual interest on the present bonded debt is \$3,194,870 (gold), or considerably less than one half the net earnings. The company now owns 1,219 miles of road with 110 miles of second track and sidings, with an equipment of 184 locomotives, 7 snow plows, 206 passenger train cars, 3,608 freight train cars and 684 road or service cars. It also owns 36 steamers and the fuel and material on hand amounts to \$1,423,101. The balance of cash on hand, bills receivable and outstanding accounts is \$2,860,384.50.

Of the lands owned by the company there were sold previous to October 1, 1870, 137,635.55 acres, which brought the sum of \$295,065.50, being an average of \$2.21 per acre. From October 1, 1870, to December 11, 1872, there were sold 122,765 acres at an average of \$4.93 per acre. From December 31, 1872, to June 30, 1873, there were sold 20,638.71 acres for \$132,337.54, or \$6.41 per acre. These sales were made to 1,446 individual purchasers, being an average of about 187 acres to each buyer. The company still adheres to the policy of selling its lands at moderate prices and long credit, most of the sales being on five years' time.

#### Ohio & Mississippi.

The company gives notice that the second-mortgage bonds on the Western Division due January 1, 1874, will be paid on presentation at the office of the Union Trust Company, No. 71 Broadway, New York. Registered bonds should be transferred to bearer at the company's office, No. 261 Broadway, before they are presented.

#### New Jersey Midland.

This company has published a circular urging holders of second-mortgage bonds to exchange them for the new consolidated bonds, in which all the indebtedness is to be funded. At a recent meeting of bondholders a proposition was made that each should advance 5 per cent. of the amount of his holding to the company. This did not meet with much favor. The local business of the road has increased very much under the present management, and still continues to increase.

#### Atlantic & Pacific.

Holders of land-grant bonds are requested to fund the four coupons falling due January 1 and July 1, 1874, and January 1 and July 1, 1875, in the company's 10-year income bonds, bearing 6 per cent. (gold) interest. Holders of second-mortgage bonds are also asked to fund the coupons falling due from May 1, 1874, to November 1, 1876, in the same income bonds. The coupons in both cases to be retained in the hands of a trustee, uncanceled, as security for the payment of interest and principal of the income bonds. Holders of land-grant bonds can at any time exchange the income bonds in which their coupons are funded for land, at par and accrued interest.

#### Mississippi Valley & Western.

Iron for this road is arriving at Quincy, Ill., 40 car-loads having been received before January 1.

#### Atlantic, Mississippi & Ohio.

This company asks holders of Norfolk & Petersburg, South Side and Virginia & Tennessee bonds, interest on which was due January 1, to accept payment of the January coupon in notes of the company, payable on or before January 1, 1879, and bearing 8 per cent interest, the coupons to be deposited with the Treasurer and retained, uncanceled, as security. The amount of the coupons is \$190,000. The company's floating debt, which was \$2,307,000 in 1871, is now \$1,257,000. To offset this debt there are in cash and accounts due \$288,000, in



supplies on hand \$200,000, and 8,000 tons of old rails, for which there is at present no market, but which are worth at least \$320,000. The company also has unsold \$1,097,000 of its consolidated gold bonds. The road was valued in 1870 on a careful appraisal at \$13,000,000, and since then \$3,330,000 has been expended on its improvement.

#### Indianapolis, Bloomington & Western.

The Supervisors of McLean County, Ill., which owns a considerable amount of stock in this company, are considering charges made by some citizens of that county. It is alleged that the reported cost of the road is too high; that a large part of the stock has been issued without sufficient consideration, and to enable certain parties to control the road; that the second mortgage is fraudulent and should be canceled; that the earnings of the road have been expended on the branch from Urbana to Havana without the consent and against the wishes and interests of the bona fide stockholders; and that the coal for the use of the road is supplied from certain mines which are controlled by officers of the company, who fix their own prices. No answer to these charges has been published as yet.

#### Rochester & State Line.

The track of this road was laid to Leroy, N. Y., 25 miles southwest from Rochester, December 31. There are now two trains at work ballasting the road, and trains from Rochester to Leroy will be put on as soon as the track is in order. Tracklaying is to be continued as long as the weather will permit.

#### Sioux City & Pacific.

This company has put up a winter bridge over the Missouri at Blair, and trains run through from Missouri Valley to Wisconsin, on the Union Pacific, without transfer.

#### Texas, Mississippi River & Northwestern.

On the Little Rock, Pine Bluff & New Orleans Division regular trains have commenced running from Chicot, the Mississippi River terminus, to Pine Bluff, the road being finally completed into the latter town.

#### Cedar Rapids & St. Louis.

This road was sold at Sheriff's sale, at Ottumwa, Ia., December 26, to satisfy a judgment of \$20,000 in favor of John S. Wolf. Mr. Wolf bid in the road and became the possessor. The sale included the roadbed from Ottumwa north to Sigourney (about 24 miles) which is nearly completed and considerable bridging done, and also the right of way, depot grounds and franchise of the company.

#### Little Rock & Fort Smith.

It now appears that there is a conflict of jurisdiction between the Johnson County (Ark.) Circuit Court which issued an injunction restraining the Bowen or Boston board of directors and the Pulaski County Chancery Court which appointed a receiver. The receiver appears to have possession only of the Little Rock end of the road, but he has the rolling stock, and runs trains, though only over that end of the road.

#### Des Moines & Minnesota.

The iron for 10 miles has been purchased and three miles of it received, but tracklaying has not been commenced, as yet.

#### Oil Producers'.

At an adjourned special meeting held December 24 the Commissioners appointed to hold the election to determine whether the company should be dissolved or not, reported that 5,909 votes were cast, of which 3,439 were in favor of dissolution and 2,470 opposed, leaving a majority of 969 in favor of winding up the company. Of the votes offered 448 were rejected on account of irregularity in the proxies. The whole number of shares is 6,787, so that a clear majority of the stock is in favor of the dissolution of the company. The company was organized to build the Pennsylvania end of the Buffalo & Jamestown road.

#### Philadelphia & Erie.

A meeting of engineers, conductors, firemen and train hands was held in Sunbury, Pa., December 31, to consider the reduction of 10 per cent. in all salaries and wages ordered to take effect January 1. A resolution was adopted accepting the reduction and appointing a committee of three, two conductors and one engineer, to see the officers of the company and learn if the salaries would be put back to the old figure when the business of the company would warrant it.

#### Marietta, Pittsburgh & Cleveland.

Two special meetings of the stockholders of this company are called. One is to be held January 10 in Marietta, O., to vote on the question of increasing the capital stock by \$4,500,000 prepaid stock, convertible into bonds. The second meeting will be held in Marietta, January 13, to vote on the question of authorizing the issue of \$4,000,000 of 7 per cent. gold bonds, convertible into stock, and of giving a consolidated mortgage on the road to secure the bonds.

#### Vermont Central.

In accordance with the order of the court the old trustees of the Vermont Central have filed in the Chancery Court at St. Albans the accounts of the road under their management. The accounts, which cover a period of seven or eight years, consist of summaries only, no details and no vouchers being included. They are accompanied by a statement to the effect that they have been examined every six months by a committee of bondholders.

The Vermont & Canada Company filed a list of objections in which the correctness of the statements generally is denied. Objections were also filed on behalf of some of the bondholders.

#### Cleveland, Mount Vernon & Delaware.

This road, in which the Pennsylvania Company owns a controlling interest, but which has been operated independently, has been leased to and will hereafter be operated by the Pittsburgh, Cincinnati & St. Louis Company. The road is 145 miles long, from Hudson, O., on the Cleveland & Pittsburgh, 26 miles from Cleveland, southwest to Columbus. The distance from Cleveland to Columbus by this line is thus 171 miles, against 138 by the Cleveland, Columbus, Cincinnati & Indianapolis.

#### New York & Long Branch.

The draw of the bridge over the Raritan at Perth Amboy, N. J., is completed. But little work is now required to finish up the bridge.

#### Turtle Creek Valley.

This company has resolved to commence work early in the spring at the junction with the Pennsylvania Railroad, about 17 miles east of Pittsburgh. The road is to run from that point northeast to Saltsburg, on the West Pennsylvania road, a distance of about 20 miles.

#### Harrisburg & Potomac.

The work of laying track and bridge building is progressing slowly. Surveys are being made for a branch from Harrisburg, Pa., south to Oxford, on the Susquehanna, Gettysburg & Potomac road.

#### North Carolina.

The bill which has passed the North Carolina Legislature authorizes this company to purchase the Western North Carolina Railroad either by private purchase or at judicial sale, and

to complete that road from its present terminus at Old Fort to the Tennessee line at Paint Rock, with a branch from Asheville to the Georgia or Tennessee line in Cherokee County. For this purpose the company is authorized to issue bonds to the amount of \$13,000 per mile and to mortgage the road for that amount. These bonds are to be sold by commissioners named in the act, and must not bear more than 8 per cent. interest, or be sold at less than 75 cents on the dollar. No more than \$3,500,000 of bonds are to be issued until the road is completed to Paint Rock.

The act is to be submitted to the North Carolina stockholders for acceptance at a special meeting. If accepted and any stockholder is dissatisfied his stock may be taken by the company and paid for at an appraised valuation.

The company is also authorized, with the consent of the stockholders of that company, to purchase the Atlantic & North Carolina road (Goldsboro to Moorhead City), and on the completion of that purchase the Governor will transfer to the company the Atlantic & North Carolina stock held by the State. The whole line shall be known as the North Carolina Railroad and shall be operated as a continuous line. Authority to build branches is given, but no branch shall be commenced until the road is completed to Paint Rock.

Authority is given to change the gauge of the road, but the whole road must be of uniform gauge, and no change can be made until the Western Division is completed, except that the new part of the line may be built of the desired gauge.

Connections and contracts may be made with other roads. No charges for local business shall be more than 25 per cent. greater than through rates for the same class of traffic.

The road from Salisbury to the Georgia line shall be known as the Western Division; that from Asheville to the Tennessee line as the Asheville & Warm Springs Division; and the Atlantic & North Carolina road as the Eastern Division.

The consolidated company, when the Western Division is completed, will own some 630 miles of road, reaching from the eastern to the extreme western end of the State.

#### Santa Cruz.

A force of 200 men is at work on this road from Pajaro Station, Cal., on the Southern Pacific, northwest to Santa Cruz.

#### Onachita Valley.

Means have been secured to complete the grading of this road, which is to extend from the Cairo & Fulton at Arkadelphia, Ark., southward to Camden, about 40 miles.

#### Lowell & Andover.

The stockholders of this company have voted to increase the capital stock from \$250,000 to \$500,000 and to issue \$250,000 of 6 per cent. mortgage bonds.

#### Peoria, Atlanta & Decatur.

A temporary injunction has been issued restraining the officers of the towns of Atlanta and Oram, Ill., from collecting taxes levied to pay interest on town bonds issued in aid of this road. It is claimed that the charter of the company was never legally passed by the Legislature, that the bonds were obtained by fraudulent misrepresentation, and finally, that the construction of the road has not proceeded according to the agreement under which the bonds were voted.

#### Pueblo & Salt Lake.

A company by this name has been organized at Pueblo, Col., to build a railroad from the terminus of the Atchison, Topeka & Santa Fe, at Granada, Col., westward to Salt Lake City, Utah. The incorporators are M. A. Shadenburg, W. A. Orman, M. D. Thatcher, James N. Carlile, George M. Clacott, O. H. F. Baxter, Peter K. Dobson and Jefferson Reynolds.

#### Palisade & Eureka.

Work on the narrow-gauge line from Palisade, Nev., southward to Eureka has been commenced, and a considerable force, mainly of Chinamen, is at work on the grading.

#### Denison & Gainesville.

A road is projected from Denison, Tex., the southern terminus of the Missouri, Kansas & Texas, westward to Gainesville, a distance of about 25 miles.

#### Railroads in Mexico.

The Mexican Congress, whose ordinary session would have expired the 15th of December, has voted almost unanimously to prolong the session one month for the purpose of coming to a conclusion on five different questions, the first of which is the question of the charges on the Vera Cruz & Mexico Railroad, which are held as oppressive by many of the Mexicans, and concerning which the Minister of Public Works made a new contract some months ago which Congress seems not inclined to ratify, though usually the Administration commands a large majority of its votes. The third question to be considered in this extra session is the contract which the Administration made lately with the Mexican Railroad Company for the construction of a railroad from Mexico to the Pacific and one to the Rio Grande, which, it is said, may not be ratified after all.

With regard to the first question—that concerning the tariffs on the railroads now in operation—the Minister of Public Works has been instructed by Congress to prepare a statement of that part of the cost of the road which was not paid by the proceeds of the shares and bonds (but was met by the Mexican Government, we believe), and statements of the par value and amounts received by the company for its stocks and bonds.

The burdensome tariffs necessary to support a line so costly as that from Vera Cruz and Mexico the *Trait d'Union* takes as a text for urging that the new lines should be constructed on the American plan, which is so much less costly than the European. Even should the Mexican company succeed in obtaining the means for carrying out its project, says the *Trait d'Union*, it must get it in Europe and adopt the English system.

#### Kansas City & St. Louis Narrow Gauge.

The officers of this company contradict the report of a consolidation with the Keokuk & Kansas City Company.

#### European & North American.

This company has transferred \$2,340,000 of its stock to the International Transportation Company of New York in payment of its debt to that company.

#### New Bedford.

Negotiations are said to be in progress for the consolidation with this company of the Taunton Branch Railroad Company. This consolidation has been talked of for some time. The New Bedford (formerly New Bedford & Taunton) Railroad extends from New Bedford, Mass., to Taunton, 20 miles, and the Taunton Branch road from Taunton to Mansfield, 11 miles. The two roads are now operated together.

#### Peterborough.

This road was formally opened for travel January 1. It is an extension of the Wilton Railroad from Wilton, N. H., northwest to Greenfield, and is 11 miles long. The road passes through a rough, hilly country, and its construction has required some heavy work. For 4½ miles from Wilton the grade is 80 feet to the mile and 40 feet for the remaining 6½ miles, the whole elevation overcome being 620 feet. The cost of the road has been nearly \$450,000, or over \$40,000 per mile. Of this \$34,500 was subscribed by towns along the line, and bonds were issued to the amount of \$415,000, of which \$280,000 have been sold. The road will be operated by the Boston & Lowell Com-

pany, which guaranteed its bonds. It is intended hereafter to extend the road to Keene on the Cheshire road, and eventually to the Vermont Central at Windsor. It has been built under the supervision of Mr. M. W. Oliver, Chief Engineer of the Boston & Lowell road.

#### St. Louis, Lawrence & Western.

A circular, bearing date December 22, announces that hereafter the Lawrence & Southwestern road and the St. Louis, Lawrence & Denver (the latter heretofore leased and operated by the Missouri Pacific) will be operated as one road under the name of the St. Louis, Lawrence & Western Railroad. The general offices are at Lawrence, Kan. The St. Louis, Lawrence & Denver extends from Pleasant Hill, Mo., on the Missouri Pacific, 248 miles from St. Louis, westward to Lawrence, Kan., 61 miles. The Lawrence & Southwestern extends from Lawrence west by south to Carbondale on the Atchison, Topeka & Santa Fe, a distance of 32 miles, making the length of the consolidated road 93 miles.

#### Cincinnati Southern.

This company advertises for proposals for grading, masonry, trestle-work and bridges for 80 miles of road from South Danville, Ky., to the Tennessee line near Chitwood's. This includes some heavy rock-cutting, eight tunnels varying in length from 460 to 1,260 feet and making in all 6,200 lineal feet of tunneling; 16 trestles, making in all 9,500 lineal feet of trestle-work in iron and wood, the height varying from 50 to 128 feet; and bridges over the Green and Cumberland rivers. Profiles and specifications can be seen and further information obtained by applying to Thomas D. Lovett, Consulting Engineer, whose office is at No. 70 West Third street, Cincinnati, O. Proposals will be received for one section or more, and must be sent to the office, as above, by January 20, 1874.

#### Camden, Gloucester & Mt. Ephraim.

This narrow-gauge road is completed from Camden, N. J., south to Gloucester, three miles, and will be ready for operation in a very few days. Work on the road was commenced October 28. The rest of the road, from Gloucester to Mt. Ephraim, will be completed early in the spring.

#### Gilman, Clinton & Springfield.

Before the Illinois Circuit Court, at Bloomington, January 2, a motion was made to discharge Mr. F. E. Hinckley as Receiver and to turn over the property to the directors, on the ground that the recent changes in the board (noted elsewhere) had cleansed the board of all that the court objected to. It was also alleged that Mr. Hinckley's management was not for the best interests of the road. Judge Tipton refused to grant the application, on the grounds that he had not the power in vacation to undo the work of the court in regular term, and that practically there is no change in the board.

#### New Jersey Southern.

The steamers Plymouth Rock, Jesse Hoyt and Fall River were sold at Newport, R. I., January 2, by the United States Marshal, under libels from various creditors of the company. It is generally believed that the sale was in the interest of Jay Gould, the former President of the company. The trustees of the first and second mortgages presented a formal protest against the sale.

#### Central of Iowa.

The round house and carpenter's shop at Marshalltown, Ia., were destroyed by fire December 29. There were six locomotives in the house, five of which were got out, but one was burned, as were the stationary engine and tools in the shop.

#### Boston, Barre & Gardner.

Mr. Farren, the contractor for the extension from Gardner to Winchendon, having thrown up his nearly completed contract, the company is finishing up the work. The track is all laid and only the ballasting and finishing up remain to be done.

#### California & Texas Construction Company.

At a meeting held in Philadelphia, December 31, the stockholders voted to approve the plan prepared by the directors for extending the time of payment of the present indebtedness, and using the money due on stock subscription to complete the unfinished portions of the Texas & Pacific road.

#### Colorado River.

The Colorado Steam Navigation Company has now five steamers and five barges plying on the Colorado River between the mouth of the river and Fort Mohave in Arizona, a distance of nearly 400 miles. The company also owns two steamers which make regular trips from the mouth of the river to San Francisco.

#### Vermont Central.

The second span of the new iron bridge over the Winooksi River at Waterbury, Vt., is completed and trains pass over it. All danger to the bridge from freshets is now considered to be passed.

#### Fitchburg.

The stockholders of this company held a special meeting in Boston, Dec. 31, to vote on the proposed lease of the Vermont & Massachusetts Railroad. After some discussion a stock vote was taken, which resulted in the confirmation of the lease by a vote of 24,741 to 52. The lease is for 999 years, and in addition to assuming the debts and liabilities of the Vermont & Massachusetts Company, the Fitchburg Company agrees to pay 4 per cent. annually on the stock for the first two years, 5 per cent. for the next two years and 6 per cent. thereafter.

The Vermont & Massachusetts road is 56 miles long, from Fitchburg, Mass., west to Greenfield, with a branch three miles long from Greenfield to Turner's Falls, and one 21 miles long from Miller's Falls to Brattleboro, Vt. This latter branch is leased to the Rutland Railroad Company for 15 years, the lease terminating in 1885. The Cheshire Railroad Company also leases the use of 10½ miles of the track, from Fitchburg to South Ashburnham, paying therefor \$51,000 per year. By the last statement the capital stock was \$2,800,000 and the funded debt \$900,000, the annual interest on which is \$37,500. At 6 per cent. on the stock the rent paid by the Fitchburg Company will be \$229,100, or deducting rents from the Rutland and Cheshire companies, \$130,100, or \$2,205 per mile. The Vermont & Massachusetts Company has also been operating under lease the 30 miles of the Troy & Greenfield road from Greenfield to the Hoosac Tunnel, which is owned by the State of Massachusetts.

#### Harrisburg & Potomac.

It is stated that this company has secured promises of substantial aid from companies with whose roads it will connect. The road is to be completed next season, thus opening a line from Harrisburg, Pa., to the Baltimore & Ohio at Frederick, Md., by the Harrisburg & Potomac and Frederick & Pennsylvania Line roads.

#### Wilmington & Reading.

This company has decided to pass the January interest on the second mortgage bonds. The reason given is that the available means of the company have been largely reduced by the diminution of business resulting from the panic and the delays in the completion of the Reading Extension and its large cost. The directors have therefore ordered a mortgage of \$500,000 on the Reading Extension, the bonds secured by which will be used to fund the interest on the second mortgage bonds. Scrip receipts will be issued for the eight coupons due from January, 1874 to July, 1877, which will entitle the holders to bonds when presented in sums of \$100, \$500, or \$1,000. The new bonds will bear 6 per cent. interest.





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## Editorial Announcements.

**Addresses.**—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR, RAILROAD GAZETTE.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

## THE WORK OF 1873.

We give elsewhere an elaborate statement of the work done in constructing new railroads in 1873, which is, we believe, very nearly exact. We have attempted to describe in it the length and location of every railroad and part of a railroad constructed during the year with sufficient exactness to enable the reader to draw it roughly on the map.

STATE	New road in 1872.	1873.	Per ct. of inc. in 1873.	Total at close of 1873.
Alabama.....	184	0	0	1,566
Arkansas.....	156	247½	55	897
California.....	195	85	7	1,305
Colorado.....	103	11	25	604
Connecticut.....	25	20	3½	897
Dakota.....	210	80½	37	291
Delaware.....	26½	21½	8½	275
Florida.....	10½	0	0	466
Georgia.....	46	99	4½	2,259
Illinois.....	683½	253½	4½	6,615
Indiana.....	183	65	1½	3,714
Indian Territory.....	149	0	0	279
Iowa.....	452	93	2½	3,736
Kansas.....	445	36	1½	2,377
Kentucky.....	143	54	4½	1,320
Louisiana.....	3	0	0	539
Maine.....	62½	0	0	871
Massachusetts.....	37	113½	7	1,572
Maryland and D. C.....	190	34	3½	1,046
Michigan.....	571	182½	6½	3,071
Minnesota.....	307	43½	2½	1,950
Mississippi.....	22	7	0½	997
Missouri.....	314	236½	0	2,910
Nebraska.....	212	0	0	1,061
Nevada.....	18	18	3	629
New Hampshire.....	43	18	7½	868
New Jersey.....	103	40½	3	1,418
New York.....	435	342	5	5,417
North Carolina.....	60	15	1½	1,365
Ohio.....	456½	131	5½	4,239
Oregon.....	82	10	4	281
Pennsylvania.....	251	191	3½	5,560
Rhode Island.....	0	22	16	158
South Carolina.....	88	88	6½	1,378
Tennessee.....	15	114	7½	1,634
Texas.....	391	485½	45	1,563
Utah.....	57	85	24	434
Vermont.....	31	53	7½	763
Virginia.....	49½	36	2½	1,573
Washington.....	40	40	60	105
West Virginia.....	76	36	6½	597
Wisconsin.....	459½	320½	17	2,198
Wyoming.....	0	0	0	459
Totals and average.....	7,340	3,777	5	70,857

There are many things which will be more apparent from the tabular statement given above than from the more elaborate account of the separate lines. This table gives the mileage of railroad completed in 1872 as well as in 1873, the percentage of increase of the last year, and the total at the close of the year. As authority for the mileage at the close of 1872 we have taken "Poor's Manual," which may be not always correct, but is doubtless the

best statement we have. We have never made an attempt to ascertain exactly the mileage of each State existing at any given date, and therefore are unwilling to be responsible for the total mileage given.

The contrast between the first and second columns in this table is very striking, and especially in their totals. We built very little more than half as much railroad in 1873 as in 1872, and while the rate of increase for the whole country was 12½ per cent. in 1872 it was only 5 per cent. last year. It should not be forgotten, however, that this is itself a very large increase. It makes the total completed in the United States since 1865 just about 35,800 miles, or more than half of the entire mileage of the country at this date was constructed within the last eight years.

The progress in the different States has been various, of course. Ten of them show a greater mileage than last year, including all the New England States except Maine, which is one of the seven States and Territories which have no new mileage, besides the four (Arizona, New Mexico, Montana and Idaho) which never had any.

In the order of the amount of new road constructed in the year, those which have built more than 100 miles rank as follows: Texas, Wisconsin, Illinois, Arkansas, New York, Missouri, Pennsylvania, Michigan, Ohio, Colorado, Tennessee and Massachusetts. There are 265 miles of new railroad in New England, 595 in the old four "Middle States," 272 in the Southern Atlantic coast States, from Maryland to Florida inclusive, only 7 miles in all the Gulf States east of Texas, 733 in Texas and Arkansas (which may be called the West of the South, and almost its only new country), 168 miles in Tennessee and Kentucky, 995 in the six Western States which touch the great lakes, from Ohio to Minnesota, 446 in the States and Territories north of Arkansas west of the Mississippi and east of the Rockies (excluding Minnesota), 225 in the mountain Territories and States east of California, and 135 on the Pacific coast.

Texas, Arkansas and Wisconsin have made really notable progress during the year, increasing by a very large percentage as well as a large mileage the railroad within their borders.

The decline of railroad construction began with the beginning, not the close of the year. It was perhaps the first decided symptom of the financial difficulties which overwhelmed the country in September. An examination of our record will show that an unusually large part of the new work consisted in the completion of roads previously begun, and that, comparatively, not many of the new lines will need to be extended before they can be made available, though doubtless many of them require considerable expenditures to put them in anything like good order for traffic. Our rule regarding reporting the construction of a new road is to give it when the rails are laid. When this has been done the road is pretty sure to be worked for traffic.

As to the prospects for the current year 1874, we have given our opinion frequently that there is likely to be a still smaller construction of new lines. Our railroads depend almost exclusively upon borrowed money—that is, scarcely any of them can be completed without some borrowed money—and investors are likely to be very slow for some to come to lend money on the security of incomplete lines not yet earning any income. There is, however, a great need of extensive new works on old lines; these are likely to have good credit, and they may to a considerable extent make up for the decline in the building of new railroads.

## Ventilating and Warming.

In the last number of the RAILROAD GAZETTE, Mr. Leeds replies to some interrogative suggestions regarding the healthfulness of breathing warmed air, which we proposed in an earlier number. He simplifies the question at issue by the assertion that "breathing all warmed air is unwholesome, or rather debilitating," no matter whether it is warmed artificially or naturally by the sun. In proof of this he asks, "Why is the mortality of our cities doubled, and sometimes trebled, when the air we inhale is heated 'naturally' to nearly the temperature of the blood?" Now, in order to show the fallacy of this reasoning, let us state it, as the logicians say, syllogistically, thus: The air is warmer in summer than in winter; more people die in cities in summer than in winter; therefore, warm air is unhealthful. Now we can with quite as much logical force say: More fruit is eaten in summer than in winter; more people die in cities in summer than in winter; therefore, eating fruit is unhealthful. The reasoning in the latter syllogism is just as sound as in the first; and in fact many people have and still do reason thus, and act upon their conclusions thus drawn. We might with quite as much logical force say, that the days in summer are longer than in winter and infer therefrom that daylight is unhealthful. As the case is stated by Mr. Leeds he has simply shown that warm weather and an increased death rate in cities are two facts which incidentally accompany each other, and not that the one is a necessary consequence of the other. That they are

merely incidental will be apparent if we take the death rate in the country in summer, and compare it with that in winter. We have no statistics at hand to make such a comparison, but would not be surprised if the proportion of deaths was greatest there in winter instead of summer. The air in the country is warmed in summer very nearly as much as in the cities, and in some places more, so that the increase of mortality is not attributable to the cause named.

It is, however, an undoubted fact, that the gases and exhalations from decomposing and putrefying animal and vegetable matter are, when breathed, a prolific cause of disease, and that such decomposition is very much stimulated by warmth. The reasoning from this fact might be stated thus:

Warmth and dirt combined always produce disease; there is more sickness in cities in summer than in winter, and more in summer in the city than in summer in the country; there is a combination of warmth and dirt in cities in summer, whereas in winter there is dirt but not warmth, and in the country in summer there is warmth but not dirt; therefore some of the excess of mortality of one season and one locality over the other is due to the unfortunate combination of warmth and dirt. We say some, because there may be other causes, and among them possibly that named by Mr. Leeds, only we do not think he has yet proved it. It will be observed in the last train of reasoning that if we deny the conclusion, we also deny the first premise. If we deny that the excess of mortality in cities is partly due to the combination named, we deny that any part of it was caused by it.

We have not the means at hand for verifying the fact stated by Mr. Leeds, that we exhale twice as much carbonic acid in breathing cold air as when breathing warm, but we have sufficient confidence in his accuracy to admit it, at least for the purposes of this discussion. But admitting it, and that it is followed by greater bodily vigor, we do not see that it follows that the general condition of health is improved thereby. If we breathe a pure atmosphere of oxygen, or if we take a drink of whiskey, we will exhale more carbonic acid; but if we take too much oxygen or too much whiskey, we are like candles burned in compressed air: we burn out too rapidly, and exhaustion follows.

In all the processes of nature there seems to be an ebb and flow. This occurs in our bodily condition. We need first a stimulant—most of us very gentle ones—and then repose. There is a "periodicity" about our diseases even. The tooth-ache has its crescendo and diminuendo movements, and our intellectual faculties are active at times and then grow dormant. Happily we are so constituted that we not only consume more oxygen and carbon in cold air than in warm, but we are stimulated to greater activity by the one than the other, thus still further increasing the consumption of food, which is only another form of combustion which supplies warmth to the body, without which our physical machinery does not work well. It is also true that, owing to the greater density of atmospheric air, when we are inactive, we inhale more oxygen than when the air is warmed. Then too it has been shown that the useful effect produced in a steam-engine is due to the degree of difference in temperature between the steam and the other mediums with which it comes in contact. Probably in the same way the mechanism of the body, whose temperature is nearly uniform, gives out more "energy" as the difference between its own heat and that of the air it breathes increases. But if all this is admitted, it still remains to show what the effect upon the general health is of being constantly stimulated by breathing cold air. This we think Mr. Leeds has not shown conclusively, and about which, as we said before, some accurate knowledge is much needed. We have consulted books on physiology in vain, and consulted doctors without gaining knowledge. Who will enlighten us?

## The International Bridge.

During the early part of last November, Mr. C. S. Gzowski, of Toronto, an eminent civil engineer and successful railroad contractor of the Dominion of Canada, completed the iron railroad bridge over the Niagara River near Buffalo, known by the above title, after three years of arduous labor and at a cost of about \$1,500,000.

Being mindful of Lord Bacon's axiom, that every man owes it as a debt to his profession to put on record whatever he has done that may be of use to others, Mr. Gzowski has supplemented his work by printing a handsome quarto volume containing a clear and detailed description of this bridge and of its processes of construction, illustrated by twenty-one plates.\*

The Chief Engineer of this bridge, by whom it was designed, was Mr. E. P. Hannaford, Engineer of the Grand Trunk Railway of Canada. Both Messrs. Hannaford and Gzowski are members of the American Society of Civil Engineers.

This bridge crosses the lower end of Black Rock harbor, thence across Squaw Island and over the main river. The distance across Black Rock harbor is 517 feet, divided into a draw span 218 feet long, and a fixed span 219 feet, and two abutments of 40 feet each. Squaw Island is crossed by an embankment 1,247 feet long. The length of iron work over the

\* Sold by Copp, Clark & Co., of Toronto, Canada; price \$5, gold.



main river is 1,887½ feet, divided into one span of 194 feet, a draw of 362 feet, three spans of 248 feet, two spans of 197 feet, and one of 193 ft. 6 in. Thus the total length of iron work is..... 2,324 ft. 6 in.  
Of abutments..... 160  
Of embankment..... 1,167

Total..... 3,651 ft. 6 in.

The bridge is 20 feet wide between centres of trusses, being originally designed as a combined wagon and railroad bridge—an intention afterward very properly abandoned.

The piers in Black Rock harbor are built upon ordinary piled foundations. Those across the main river, beginning at the Canadian shore, are as follows:

No. of pier.	On land	None	Normal velocity of current, miles per hour	Depth of water, in ft.	Total depth of soft material, in ft.	Total depth to rock, in ft.	Character of foundation.
W. abut.	On land	None					On rock.
1	2.58	10				10	Tight caisson on bare rock.
2	2.77	16				16	" " "
3	3.20	28				28	" " "
4	5.11	37				47	Bottomless caissons sunk by dredging to rock; concrete filling. Masonry sunk in tight caisson.
5	5.12	41				48	Bottomless caisson sunk through soft material and piled inside.
6	3.55	30				45	Tight caisson on piles.
Draw pier	3.33	16				?	" " "
8	2.60	9				?	" " "
E. abut.	On land	None					" " "

A glance at this table will show that the great difficulties were to be found at Piers 4 and 5, on account of the great depth of water and velocity of current.

It must not be forgotten, also, that perhaps the greatest difficulty of all arose from the fact that a southwest wind drives the waters of Lake Erie into the funnel-shaped inlet of Niagara River and raises the level of water at bridge piers four to five feet in as many hours. This increases the velocity of the current from the normal rates above given to, as stated by Mr. Gzowski, twelve miles per hour.

The method devised by Mr. Hannaford for putting down these very difficult foundations of Piers 4 and 5 was as follows:

A rectangular, bottomless caisson 31x54½ feet, with bow pointed at an angle of 90 degrees and stern at 60 degrees, making 97 feet over all, was framed of two solid walls of foot-square timber, placed 2 feet apart, except for the lower 6 feet, where they were solid and iron-shod. They were braced together by rows of vertical timbers placed 6 feet apart and bolted through and through. The caisson was braced internally by five rows of transverse braces.

The caisson, drawing 18 feet of water, was floated by powerful tugs to a point in line with its site and 600 feet above it. It was then anchored by six chain cables and heavy anchors radiating from the upper nose, allowed to drop down by the tautening of the cables to within 140 feet of its site, and then a pair of spring cables were carried out, one on each side of the lower end.

The caisson was then built up by adding more timbers, and as the cables were raised, it went down stream a little, until it was dropped exactly into place. It was then loaded by filling the space between the sides with stone, and when grounded was secured by dropping six iron bars 4 inches in diameter through holes in the bottom between the sides, down into the river bed.

The material inside was then removed by divers, assisted by a Cummings dredge. This was a slow and tedious process, but at last the caisson was sunk to the rock. The bottom was then leveled, and an inner water-tight caisson, containing the masonry, was sunk in the usual way.

The method adopted of erecting the iron work of this bridge over such deep and rapid water was very ingenious, and is believed to have been adopted for the first time by the constructors of this bridge.

It was accomplished by means of a staging resting on six pontoons (for the 248 spans), each 55x17x10 feet high, rectangular at the lower end and pointed at the bow. Each one was divided in two by a bulk-head, having a valve of communication. Each compartment had a valve to admit water from the outside. The pontoons were placed with their noses pointing up stream, at equal distances apart, and connected by a strongly braced staging upon which the iron work was erected by travelling cranes.

The top of the staging was kept about a foot above the tops of the piers so as to prevent the iron work being landed on the masonry by a fall of the river, before it was ready.

As soon as the iron work was complete, the pontoons were lowered by the gradual admission of water, and when the iron work had landed on the piers, they and the lower staging were floated away to another span. This was done by hauling them up stream, and then dropping them down into place.

This plan worked very well and is preferred by Mr. Gzowski to a fixed staging, as any irregularity of shape was easily rectified by pumping water in or out.

The time occupied in lowering from five openings of hydrants was about a half to three-quarters of an hour.

The superstructure of this bridge was built at Phoenixville, and is the quadrangular girder of the form usually adopted by this company, and built according to its specifications.

It may be of interest to examine why it is that Canadians prefer the American system of iron bridge building to that employed in England and her Asiatic colonies. That the fact is so, is shown not only by this bridge, but by the Miramichi bridge, 2,520 feet long, and the Restigouche, 1,060 feet long,

† The elongation of the stern was to steady it in the quick water, and was further helped by a long blade projecting about 20 feet, like the tail of a fish.

both in spans of 210 feet, on the line of the Inter-Colonial Railway of Canada, and by somewhat over half a mile of various spans on the Grand Trunk Railway of Canada—all built by the Phoenixville Company during the last three years.

In the first place, notwithstanding the lower cost of English iron, and the lower rate of wages paid to English operatives, the American bridges cost less money, owing to two reasons, one of which is the less weight of iron required, and secondly, the vastly greater economy of transportation and erection.

Nor is their lightness gained by any sacrifice of strength. The factor of safety is the same in both instances. In other words, the strain per square inch caused by the dead and live loads together is the same. But the American bridges are made of a better and tougher quality of iron, and in exactness of workmanship they are very much superior to their rivals, owing to all the fitting being engine-turned and planed work.

The English bridge is made in heavy parts, whose transportation costs a good deal. When these parts have reached their destined site, about as much labor has to be expended in riveting them together as in making the parts. The difficulties of transporting skilled workmen, and the inconveniences of riveting on scaffolding, and in awkward places, are very great.

The American bridge, being all fitted by machinery at the works, is put together by a few unskilled men by driving a few pins through holes accurately fitted to receive them.

The economy of weight is chiefly due to the fact that the dead weight, or parts that do no supporting work, are reduced to a minimum.

In the uniformity and equal distribution of strains, the American bridges excel all others.

These are briefly the reasons why American bridges are supplanting English ones, both in Canada and in South America, and are destined to do so all over the world.

The final cause of the difference between the two systems is this: English bridges are sold by the ton, and it is for the interest of their manufacturers to use the lowest-priced iron, and the most of it.

American bridges are sold by the span, and it is for the interest of their makers to use less iron, and by accurate workmanship and a better quality of material to accomplish the same or better results. The larger the span the more marked the difference between them.

#### Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information (for the first time) of the laying of track on new railroads, as follows:

*Peterborough.*—Completed from Wilton northwest 11 miles to Wilton, N. H. *Camden, Gloucester & Mount Ephraim.*—Track is laid on this road from Camden south 3 miles to Gloucester, N. J. *Rochester & State Line.*—Extended southwestward 9 miles to Leroy, N. Y. *Chicago & Paducah.*—Extended from Windsor, Ill., southward 15 miles. *International & Great Northern.*—The International Division has been extended from the Brazos River southwest 15 miles.

This is a total of 53 miles of new railroad, and the total completed in 1873, according to the corrected list given elsewhere, is 3,777 miles.

#### Charleston to Chicago.

The recent convention in Charleston has in view really a connection of Charleston, S. C., with the States northwest of it by the construction of a line from Spartanburg, which is in northwest South Carolina at the end of a branch of the South Carolina Railroad, northwestward by way of Asheville, N. C., and down the valley of the French Broad across the Alleghenies and to a connection with the railroads of East Tennessee and Kentucky. To complete a connection with the East Tennessee, Virginia & Georgia Railroad there is needed only 115 miles of new railroad, which, however, would cross all the ranges of the Appalachian chain, though, it is said, by a comparatively easy route. This link would unite the Spartanburg & Union Railroad of South Carolina with the Morristown Branch of the East Tennessee, Virginia & Georgia, which connects with the main line 40 miles northwest of Knoxville. This would give a route 421 miles long from Charleston to Knoxville. To complete a connection further northwest there is needed an extension of the Knoxville Branch of the Louisville & Nashville Railroad from its present eastern terminus south 80 miles to the northwestern terminus of the Knoxville & Ohio Railroad, now in operation for 40 miles northwest of Knoxville. This would complete a railroad line 681 miles long, from Charleston to Louisville, and about 30 miles more of road would give a connection with Cincinnati of about the same length, and, of course, with all the railroads centering in these cities. As these connections can be had by the construction of about 200 miles of new railroad, and as South Carolina and the adjoining States are large consumers of the products of East Tennessee and the Ohio valley, the scheme seems well worthy of attention. There are some, however, who propose to make an entirely new line all the way from Charleston, or Spartanburg, to Chicago, which is entirely unnecessary, as existing roads could do the work quite as well or better north of the Ohio surely, and probably to the terminus of the Louisville & Nashville, though the latter might be disinclined to have part of its line used for Cincinnati business. This project is, however, a rival of another South Carolina project which is almost as old as the oldest American railroad, and has had, first and last, a vast deal of money expended on it. We mean the Blue Ridge Railroad, which is intended to cross the mountains about 60 miles further southwest, which requires about the same amount of construction (perhaps a little more), but has had a good deal of costly work done, and has the further advantage of affording almost equal advantages for outlets to Charleston, Savannah and Port Royal; and any mountain road from Tennessee into the Carolinas will need the traffic to all

these places and those on the way in order to be supported handsomely. There is hardly a probability that Chicago will ever have a large traffic with these South Atlantic ports and States. They are consumers of its exports, to be sure, but they can get their markets glutted from Ohio River cities 300 miles nearer to them; and, indeed, East Tennessee itself should be able to supply most of the cattle, mules, flour and hay required by these cotton-growing districts, and a large part of the corn and pork. The Northwest buys scarcely anything from these States, and any railroad line from it to them must be supported chiefly by the southward traffic, as are all north and south roads west of the Alleghenies and south of the Ohio—where they have any Southern connections.

NAMES OF RAILROAD MEN, as of other men, are likely to be badly used by printers, and this is especially the case with those names which are a little different in spelling or in sound from common names. The gentleman named Willson has to labor his life long to prevent even his intimate friends from dropping from his name one l, and the one he chiefly values, as distinguishing him from the common herd of Willsons. Mr. Morris K. Jesup, of New York, who is a director or otherwise connected with a great number of railroad companies, has his name given as "Jesup" from Iowa to Georgia. Out of Pennsylvania, and perhaps we might say out of Philadelphia, Mr. J. Edgar Thomson is made Thompson. The most obstinate case of all, doubtless, was that of Mr. Johns Hopkins, the Baltimore millionaire, for so many years a leading director of the Baltimore & Ohio Railroad Company. We hardly remember to have seen Mr. Hopkins' Christian name given properly in any journal out of Baltimore, except our own, where it has two or three times been printed wrong, in spite of our corrections. Now notices of his life and death and munificent charities are printed in every newspaper, and in almost every instance he is spoken of either as John Hopkins or John S. Hopkins. Indeed it was a difficult case to deal with. The average compositor, taking the s at the end of the name as a slip of the pen, gives it to you as "John." Then when you mark in an "s," the inherent improbability of "Johns" as a Christian name causes him to assume that you meant a capital "S," and neglected to put a period after it—negligences not uncommon in editorial proofreaders. So the "corrected" name is given to the world as "John S." Hopkins. Scarcely any man in the country has been "called out of his name" so often by the newspapers. We hope it will be got right on the tombstone, but the stonecutter will bear watching.

THE MILWAUKEE NEWS objects to our speaking of the Wisconsin Central, the Milwaukee & Northern and the Milwaukee & St. Paul under their recent arrangements as forming Chicago lines with a terminus at Chicago. Now we are not anxious to call these Chicago roads; but we give the distances and routes by them beginning with Chicago, rather than Milwaukee or another place, because, as we were informed, the through trains—at least some through trains—over the connected lines will run to and from Chicago. We by no means wish to intimate that the roads, or either of them, will serve Chicago rather than Milwaukee, or be worked in the interest of the first place especially. Such a policy is, to our view, a petty and unwise one, and one very unlikely to be adopted by a great railroad, or indeed by any whose proprietors have not a greater stake in the prosperity of some one town on the line than in the line itself. It is the business of railroads and other carriers to carry goods and passengers, not where the railroad managers want them to go, but where they want to go themselves. It is the business of the people in a city to build up its traffic and compete with other cities, and a railroad should not direct its energies to this object unless it cannot carry to the rival city or cities, or can do so only at a disadvantage. If Chicago cannot attract business enough from the Wisconsin Central line to make through trains profitable, it will not have them long, we venture to say; but as long as it does it is quite proper to count distances on that road from Chicago.

THE "BLOCK SYSTEM" can hardly be called cheap, it appears, if we accept the experience of the London & North-western Railway. The Chairman of that company, in a recent communication to the President of the Board of Trade, says that "the sum expended on the block and interlocking system has amounted, for some years past, to an average of fully £80,000 per annum, and that sum will be exceeded this year." As the company works about 1,500 miles of road (in 1871 1,472 miles), this is an expenditure per mile of about \$267 gold. This includes, we suppose, the cost of construction and working, and is due chiefly to the former, the apparatus not being fully introduced yet. So we must probably multiply this average yearly cost by some number in order to obtain the cost of establishing it. The London & North-western, however, has a great number of stations and a traffic hardly exceeded in the world, requiring 4,000 cars for its passenger trains, third tracks on some sections and a fourth track begun on one, and having 16,000 men employed in train service alone.

A SPANISH RAILROAD ACCIDENT (the account of which, by the way, reaches us in an English newspaper published in Buenos Ayres), consisted in thirteen coaches of a passenger train going over a bridge, killing eight or ten persons and wounding forty. The account says: "Strange to say, all the passengers' baggage disappeared by enchantment, which makes people suppose the brigands had pulled up a rail," and "only 250 of the survivors could proceed to Madrid half-naked, having lost all their baggage;" though why they should be half-naked after their baggage was stolen if they had not been in that condition before, we do not clearly see, as there is no intimation that the brigands stripped the passengers as well as the baggage car.



The MECKLENBURG STATE RAILROAD has just been sold to a chartered corporation, which, apparently, the State thinks better qualified than itself to work the road. Moreover the State sells the road for less than cost. The property cost \$10,300,000 and is sold for what is equivalent to \$7,300,000, the price including an annuity of \$225,000 a year for 64 years, which is capitalized at 5 per cent. interest to make the \$7,300,000. This line is about 200 miles long and cost therefore about \$50,000 per mile when iron and labor were much cheaper than now.

#### THE SCRAP HEAP.

##### Cubic Space Occupied by a Ton of Coal.

A correspondent of *Smead's Coal Trade Circular* gives the following table of the space occupied by a ton of anthracite coal of each size, as determined at the Lehigh & Susquehanna scales at Penobscot, Pa.:

Lump.....	32.2	cubic feet per ton of 2,240 lbs.
Broken.....	33.9	" " " "
Egg.....	34.5	" " " "
Stove.....	34.8	" " " "
Chestnut.....	35.7	" " " "
Pea.....	35.7	" " " "

##### Heating Feed Water for Locomotives.

Two locomotives on the Boston & Maine road are being fitted with a feed-water heater which consists of a coil of pipe placed inside the smoke-stack, and connected with the pump which supplies the boiler. The cold water from the tender passes through this pipe. The device is not a new one, though there may be some peculiarities of construction or arrangement in this instance.

##### Railroad Manufactures.

The works of the Keystone Bridge Company at Pittsburgh employ about 300 men. About 100 men were recently discharged, on account of the completion of the work for the St. Louis Bridge. Wages have been reduced 10 per cent.

The Marietta Iron Works Company at Marietta, O., has been reorganized under the name of the Marietta Iron Company. The change brings new men and capital into the concern, and the rolling mill, which has been closed for some time, will soon be started up again.

The Valley Iron Company, at Youngstown, O., has been reorganized under the name of the Ridgway Iron Company, and arrangements are being made to re-open the works.

The Rogers Locomotive Works at Paterson recently shipped a locomotive to Cuba, and have, it is said, but little work remaining in the shop. The Grant Locomotive Works are building some engines for the United States Rolling Stock Company. The Danforth Locomotive Works have a little more work in the locomotive shop, while there is considerable work doing in the cotton machinery department.

The shops of the Watson Manufacturing Company at Paterson, N. J., are full of work. Bridges have recently been shipped to the Maine Central and Greenville & Columbia roads. A contract has recently been signed for an iron bridge, some 2,300 feet long, over the Rio de Chicama in Peru.

##### The Batchelder & Thompson Brake Patent.

The United States Circuit Court at Chicago has given a decision confirming the report of the Master in Chancery in the case of Bayles against the Chicago & Northwestern Railway Company. By this opinion it is decided that the Stevens' brake, as used by the Chicago & Northwestern, is an infringement of the Batchelder & Thompson patent, and that the company must pay the amount of damages assessed by the Master's report. These damages amount to \$63,638.40, to which must be added the costs and disbursements in the suit, making the whole amount to be paid \$67,314.09, for which amount an execution is ordered to issue against the defendant.

##### Chesapeake & Ohio Canal.

At a meeting of the directors held in Baltimore, December 29, the committee on accounts reported that during the year \$256,662.88 has been appropriated to pay overdue bonds and coupons. The committee has destroyed coupons and certificates of debt to the amount of \$158,769.25, and repair bonds and coupons to the amount of \$1,720. Of the amount heretofore appropriated to pay back coupons, \$120,400 remains on deposit, owing to the refusal of some large holders to accept payment until the decision of the suit now pending, in which they claim interest on overdue coupons. The board decided not to pay another coupon out of the funds on hand at the present time.

The company announces that, in accordance with an order of the Baltimore Circuit Court, the sum of \$120,474 now on deposit in Baltimore will be applied to the payment of the coupons on the preferred bonds which became due January 1 and July 1, 1859. This money was heretofore appropriated to pay coupons due before 1859, but some of the holders refused to accept payment unless interest was paid on the coupons from the date when they became due. The Maryland courts have decided against this claim, but an appeal is now pending.

#### Railroad Construction in 1873.

We give herewith a record of the new railroads constructed in the United States during the year 1873. As we have published weekly an account of the new mileage of which we had obtained information during the previous week, this record is to a great extent a summary of information previously given. It has been carefully examined, however, and made accurate where at all uncertain by information from the railroad companies and their engineers. As it stands it is nearly exact, our work for previous years having given us, what is most difficult of all to fix exactly, the exact points where tracklaying was left off at the end of the previous year. There are doubtless some errors, but they are nearly all very small, and while we believe we have omitted no line of any length built during the year, we are pretty sure that we have not committed that much commoner and worse error of counting lines on which the track is not yet laid. Our constant communication with engineers enables us to obtain the fullest and most accurate information of nearly all new works, and the statements in detail which we make, for every branch and line, make it easy to point out our errors if any exist; and we will be very glad to make note of any such corrections, and thankful to those who make them. Comments on the new construction of the year will be found elsewhere.

In the statements of percentages of increase and total at the close of the year, given at the bottom of the statement for each separate State, we have adopted the figures given in "Poor's Manual" for the close of 1872.

#### NEW HAMPSHIRE.

None of the lines on which progress was made last year were

completed, except the Portsmouth & Dover. The others are to be extended hereafter, and two of them (the Portland & Ogdensburg and the Nashua & Rochester) are intended as sections of long and important routes.

**Boston, Concord & Montreal.**—The White Mountains Railroad, which is leased and worked by the above, has had a branch extended from Bethlehem southward 5 miles to Twin Mountains. With its leased line, the Boston, Concord & Montreal now works 155½ miles of road.

**Nashua & Rochester.**—The track was laid from the western terminus of the Portland & Rochester at Rochester southward 15 miles to Lee, leaving 18 miles of completed road-bed southward to Nashua on which track is yet to be laid. The road is contracted to be leased to the Worcester & Nashua when completed, and is the link needed to complete a route from New York to Portland with no detour to Boston.

**Peterborough.**—Completed from Wilton northwest 11 miles to Greenfield. It is substantially an extension of the Wilton Railroad, and, with it, is worked by the Boston & Lowell, which—the two together—extend for 26 miles northwest from Nashua, and 66 miles from Boston.

**Portland & Ogdensburg.**—This road was extended from North Conway northward 12 miles to Upper Bartlett, N. H., through difficult mountain country. This makes the section from Portland northward 72 miles long.

**Portsmouth & Dover.**—Completed from Portsmouth northward 12 miles to Dover. It is controlled and will doubtless be worked by the Eastern.

Besides these New Hampshire railroads, five miles of the 24 of the Nashua & Acton are in New Hampshire, making a total of 60 miles of new road laid in the State in the year, which increases its mileage by 7½ per cent., making it 870 miles.

#### VERMONT.

Two lines were completed in this State, and the third, which is intended as a section of a great line from the St. Lawrence to Portland, had more work done on it than would appear from the small amount of track laid.

**Montpelier & Wells River.**—The road has been completed from Montpelier eastward 38 miles to Wells River, 35 miles of it in 1873.

**Missisquoi & Clyde River.**—The road has been completed from Richford eastward to Newport by an extension for 10 miles. It is now worked in connection with the Southeastern Counties Railroad of Canada, and with it gives the Passumpsic Railroad a connection with Montreal.

**Portland & Ogdensburg.**—The Vermont Division was extended in January from Morrisville northward 4 miles to Hyde Park, completing a line 60 miles long from West Concord (7 miles east of St. Johnsbury) to Hyde Park. Also, 4 miles of track was laid from Swanton, near the northwest corner of the State, eastward.

The 53 miles completed in the year makes the total length of line in the State 763 miles, being an increase of 7¼ per cent.

#### MASSACHUSETTS.

All of the new lines or extensions, with perhaps one exception, make the roads complete. All but the Nashua & Acton are intended almost exclusively for local traffic.

**Ashburnham.**—Completed from the Vermont & Massachusetts at Ashburnham northward 2½ miles to Ashburnham Center. It is worked as a branch by the Vermont & Massachusetts.

**Boston, Barre & Gardner.**—Extended 9 miles on the north end from Gardner northward to a junction with the Cheshire at Winchendon, making the road 32 miles long from Worcester northward.

**Eastern.**—The Marblehead Branch was completed from the main line at Swampscott northeast 4 miles to Marblehead, reducing the distance from Boston to Marblehead to 16 miles.

**Lancaster & Hudson.**—Completed from a junction with the Marlboro Branch of the Fitchburg Railroad at Hudson west by north 9 miles to a connection with the Worcester & Nashua at Lancaster.

**Middlesex.**—Completed from Lexington west 6 miles to Concord. It is worked by the Boston & Lowell as an extension of its Lexington Branch.

**Nashua & Acton.**—Completed from the Fitchburg Railroad at West Concord Junction northward 24 miles to Nashua, N. H., 19 miles of which is in Massachusetts.

**Old Colony.**—The Cape Cod Division was completed by an extension from Wellfleet northward 15 miles to Provincetown, which is very near the extremity of the Cape, and 121 miles from Boston by this road, which describes something like two-thirds of a circle to reach it.

**Springfield, Athol & Northeastern.**—This road, heretofore the Athol & Enfield, has been completed by an extension from Barrett's southwest 16½ miles to Springfield, making the whole line 47 miles long from Springfield northeast to Athol.

**Ware River.**—Extended from Gilbertville northward 33 miles to a junction with the Cheshire Railroad at Winchendon, making the line 49 miles long from Palmer to Winchendon. It is to be worked by the Boston & Albany, which connects with it at Palmer, but it has been worked hitherto by the New London Northern.

**Worcester & Shrewsbury.**—Completed from Worcester eastward 3 miles to Lake Quinsigamond. It is of 3-foot gauge.

The total length of these new lines is 117½ miles, increasing the mileage of Massachusetts by 7 per cent. and making it 1,776 miles.

#### RHODE ISLAND.

**Providence & Springfield.**—Track was laid from Providence northwest 22 miles, to Pascoag.

This is an increase of 16 per cent. in the mileage of Rhode Island, which is now 158 miles.

#### CONNECTICUT.

**New Haven, Middletown & Willimantic.**—Completed by an extension from Middletown northeast 29 miles to Willimantic, Conn., where it meets the southwestern terminus of the New York & New England. The whole road, from New Haven to Willimantic, is 62 miles long.

This increases the mileage of Connecticut by 3¼ per cent., making it now 897 miles.

#### NEW YORK.

The work in New York has consisted chiefly in the construction of short lines and parts of lines. The longest line completed is but 40 miles (Geneva & Ithaca). Seven of the fifteen lines named were completed during the year, and of these the New York & Oswego Midland is a long line and intended for through traffic chiefly. Conspicuous by their absence are three or four companies which promised a year ago to have "great through lines" well under way or nearly completed by this time.

**Buffalo & Jamestown.**—Extended from the last year's terminus south by west 20 miles, making the road 26 miles long, from the junction with the Buffalo, New York & Philadelphia road, three miles south of Buffalo.

**Carthage, Watertown & Sackett's Harbor.**—This road has been completed by an extension of 11 miles from Watertown, N. Y., a little south of west to Sackett's Harbor. The older portion of the road, from Carthage to Watertown, 18 miles, was built in 1871. The road is worked by the Utica & Black River Company.

**Central Extension.**—Completed from the terminus of the Central Railroad of Long Island east by south 10 miles to Babylon.

**Geneva & Ithaca.**—Completed from Geneva southeastward 40 miles to Ithaca.

**Harlem River & Portchester.**—Completed from the Harlem River opposite the north end of Manhattan Island northward 12½ miles to a junction with the New York, New Haven & Hartford at New Rochelle. The road is leased and worked by the New York, New Haven & Hartford.

**Lake Ontario Shore.**—Extended from a point nine miles west ofodus west 2 miles to Ontario, making the road 51.52 miles long, from Oswego westward.

**Long Island.**—The Flushing Branch was completed from Newtown northeastward 4 miles to Flushing.

**New York & Oswego Midland.**—Completed by the construction of 18 miles of road in Delaware County, New York, making the road 260 miles long from Oswego south by east to the New Jersey line at Unionville, whence the 73 miles of the New Jersey Midland extends it to Jersey City.

**New York, Boston & Montreal.**—Track was laid for three miles south of Lake Mahopac, making that section of the road (north and west to Brewster's) 10 miles long; and from the southern terminus at Kingsbridge on Harlem River north about 8 miles; in all 11 miles. Some miles of grading are done both north and south of Lake Mahopac.

**Rhinebeck & Connecticut.**—Track has been laid from Rhinebeck, N. Y., northeast to Mount Ross, 25 miles. The grading is completed to Boston Corners, 36 miles from Rhinebeck, where connection is made with the Poughkeepsie & Eastern and through that road with the Connecticut Western. The road is built mainly to carry coal from the Delaware & Hudson Canal, whose Hudson River outlet is at Rondout, opposite Rhinebeck, eastward.

**Rochester & Pine Creek.**—Track has been laid on a section seven miles long from Perry, N. Y., southwest to Gainesville on the Buffalo Division of the Erie Railway, and that section has been opened for traffic.

**Rochester & State Line.**—The track on this road is laid from Rochester, N. Y., southwest 25 miles to Leroy, and that section is nearly ready to be opened for business. The grading and bridging of the road is substantially completed to Salamanca, the junction of the Erie and Atlantic & Great Western roads, which is to be its southwestern terminus.

**Syracuse & Chenango Valley.**—Extended in January from Erieville southeastward 14 miles to Earlville, making the line 41 miles long from Syracuse to Earlville.

**Utica & Black River.**—The Carthage, Theresa & Clayton Division, which is 34 miles long, running from Carthage, N. Y., northward 13 miles to Philadelphia, and thence west by north to Clayton on the St. Lawrence, has been completed by the construction of 31 miles of road, three miles having been completed near the close of 1872.

**Utica, Ithaca & Elmira.**—The Southern Division was completed from Horse Heads on the Northern Central eastward 20 miles to Van Ettenville on the Ithaca & Athens by the construction of 12 miles of new road. The other eight miles was not reported last year. The other part of the road is considerably further north, from Ithaca northeast to Cortland.

The total length of the new construction is 242 miles, adding nearly 5 per cent. to the mileage of the State, and making it 5,167 miles.

#### NEW JERSEY.

**Camden, Gloucester & Mount Ephraim.**—Completed from Camden south to Gloucester, 3 miles. It is of 3-foot gauge.

**Jersey City & Albany.**—Completed from a junction with the New Jersey Midland, 12 miles from Jersey City, northeastward 12 miles to the New York State Line near Tappan.

**Mercer & Somerset.**—This road has been completed by an extension of 18 miles from Pennington, N. J., northeast to East Millstone, where it connects with the Millstone & New Brunswick road, but only a portion has yet been opened for traffic. The road is 22½ miles long, from Somerset Junction on the Belvidere Delaware to East Millstone. It will be operated by the Pennsylvania Railroad Company.

**New York & Long Branch.**—Track has been laid from Elizabethport southward about 6 miles to Woodbridge Creek. The grading is nearly completed to Perth Amboy and the bridge over the Raritan at that place is nearly finished. Work has been commenced south of the Raritan. The road is owned by the New Jersey Central.

**United New Jersey Railroad & Canal Company.**—The Pennsylvania Railroad Company, the lessee, has completed a branch in Jersey City to Harsimus Cove, 1½ miles long.

This is a total of 40½ miles, making the total length of New Jersey lines 1,418 miles, an increase of 3 per cent.



## PENNSYLVANIA.

**Alleghany Valley—Eastern Extension.**—This line, which is to form the Pennsylvania's "low-grade" line over the Alleghanies, was extended from the last year's terminus eastward 49 miles to Summit Tunnel, 65 miles from the junction with the Alleghany Valley, and from the eastern terminus at Driftwood, on the Philadelphia & Erie, westward 20 miles to Benet; in all 69 miles. There remains about 20 miles to unite these sections and complete the road.

**Corning, Cowanesque & Antrim.**—The Cowanesque Branch was completed from the main line at Lawrenceville westward 12 miles to Elkland.

**Cumberland Valley.**—The Dillsburg Branch was completed from the junction 9 miles southwest of Harrisburg south 8 miles to Dillsburg.

**Dunning's Creek.**—Completed from Bedford northward 11 miles to Holderbaum's. It is worked as a branch of the Bedford Division of the Pennsylvania Railroad, with which it connects at Bedford.

**Montrose.**—Extended north 3 miles to within two miles of the intended terminus at Montrose, making it 25 miles long, from Tunkhannock northward. It is of 3-foot gauge.

**Peachbottom.**—On this narrow-gauge (3-feet) line track has been laid from Oxford, Pa., westward to the Octorara Creek, 4 miles. The larger part of the grading to the Susquehanna River, 20 miles from Oxford, is done.

**Pennsylvania.**—The Williamsburg Branch was completed from the junction with the Hollidaysburg & Morrison Cove Branch one mile south of Hollidaysburg east 13 miles to Williamsburg, which is 22 miles from Altoona.

**Pennsylvania & Delaware.**—Extended from Avondale south 7 miles to Delaware line, where it meets the Delaware & Pennsylvania, which continues it southeast to Delaware City, making a line 38 miles long from the Pennsylvania Railroad at Pomeroy southeast to Delaware City. It is leased and worked by the Pennsylvania.

**Perkiomen.**—This railroad, which is leased and worked by the Philadelphia & Reading, was extended from Green Lane northward 5 miles to Pennsburg, making the road 23 miles long, from the junction with the Reading 25 miles from Philadelphia northward to Pennsburg.

**Pittsburgh, Virginia & Charleston.**—Extended southward up the Monongahela River 16 miles to Monongahela City, making the line 32 miles long from Pittsburgh.

**Southwest Pennsylvania.**—Completed from its junction with the Pennsylvania Railroad at East Greensburg, 31 miles east of Pittsburgh, southward 24 miles to a connection with the Pittsburgh, Washington & Baltimore at Connellsville.

The road is worked by the Pennsylvania.

**Stony Creek.**—Completed from the North Pennsylvania at Lansdale south 10 miles to Norristown.

**Wilmington & Reading.**—Extended from the late terminus at Birdsboro westward 9 miles to Reading, making the line 64 miles long from Wilmington to Reading.

This is a total of 191 miles of road on thirteen different lines. This is an increase of 3½ per cent. in the mileage of Pennsylvania, making it 5,560 miles. Most of the new roads are local lines. The most important, doubtless, is the Eastern Extension of the Alleghany Valley, over which the immense freight of the Pennsylvania's lines is to pass over the mountains by a route somewhat longer, but very much easier, than the present one. Six of the thirteen new lines are in the interest of the Pennsylvania.

## DELAWARE.

**Delaware & Pennsylvania.**—Completed by an extension northwest 7½ miles to the Pennsylvania line and a connection with the Pennsylvania & Delaware road, which continues it to the Pennsylvania Railroad at Pomeroy, by which it is worked, forming a branch 38 miles long from Pomeroy southeast to Delaware City.

**Smyrna & Delaware Bay.**—Track has been laid on this road, the New Jersey Southern's Delaware line, from Bombay Hook, Del., westward to Massey's, the junction of the Kent County and Queen Anne's & Kent roads, a distance of 16 miles. The road is not open for business, and indeed can hardly be called completed, as no ballasting has been done, and work is now suspended. About two miles of the road is in Maryland.

This is 21½ miles of new railroad, increasing the mileage in the State by 8½ per cent. to 275 miles.

## MARYLAND.

**Baltimore & Ohio.**—The Metropolitan Branch was completed in February by the laying of track on 13 miles which remained incomplete at the close of 1872. This branch is 42 miles long, from Washington, D. C., northwest to Point of Rocks, Md., and is the western outlet of Washington to the main line of the Baltimore & Ohio.

**Western Maryland.**—The Baltimore Extension was completed from Owing's Mills southeast 12 miles to a junction with the Baltimore & Potomac in the western part of Baltimore, while the road has been extended on the other end from Hagerstown southwest 7 miles to the Potomac at Williamsport, making the line 95 miles long.

Besides these two miles of the Smyrna & Delaware Bay Railroad are in Maryland, making the total of the new mileage 34 miles, an increase of 3½ per cent., the total in the State (including the District of Columbia) being 1,046 miles.

## VIRGINIA.

**Washington City, Virginia Midland & Great Southern.**—At the close of the year the track on the Danville Extension had been laid from Lynchburg, Va., southward for 36 miles to a point 10 miles beyond the Staunton River. Much of the grading on the remaining 30 miles of the road is completed.

This adds 2½ per cent. to the mileage of the State, making it 1,573 miles.

## WEST VIRGINIA.

**Chesapeake & Ohio.**—The main line was completed about the end of January by the laying of 22 miles of track. A branch

2.3 miles long to new iron works at Low Moor was also completed.

**Martinsburg & Potomac.**—Completed from the Potomac River at Powell's Bend, southeast 12 miles to Martinsburg. It forms virtually an extension of the Cumberland Valley, which works it, and is the first section of the Pennsylvania's proposed line up the Shenandoah Valley.

This total of 36 miles is an increase of 6½ per cent., making the total length of road in West Virginia 597 miles. The completion of the Chesapeake & Ohio is likely to be an era in the history of the State, as it opens for development a coal and iron district hardly excelled in the world in quality or extent.

## NORTH CAROLINA.

**Northwestern North Carolina.**—Extended west 15 miles, making it 29 miles long, from Greensboro west to Salem. The Richmond & Danville, with which it connects at Greensboro, works it as a branch.

This increases the mileage of the State by 11.5 per cent. making it 1,265 miles.

## SOUTH CAROLINA.

**Atlanta & Richmond Air Line.**—This road was completed from Charlotte, N. C., west by south 266 miles to Atlanta, Ga., by the filling of the following gaps left last year: From the Cherokee River, S. C., west 17 miles to a point six miles east of Spartanburg; from a point nine miles west of Spartanburg west 23 miles to Greenville, S. C.; and from the Saluda River, S. C., westward 74 miles, of which last section about 24 miles is in South Carolina. The whole new mileage is 114 miles.

**Port Royal.**—From Penn Branch northward 24 miles to the Savannah River the track was laid in 1873, completing the line, which is 111 miles long, from Port Royal northwest to Augusta, Ga.

This is a total of 88 miles of new railroad, making the aggregate in the State 1,378 miles, an increase of 7 per cent.

## GEORGIA.

**Southwestern of Georgia.**—The Blakely Extension was constructed from Albany, the late terminus, southwestward 36 miles to Arlington; the Perry Branch, from Port Valley southward 13 miles to Perry. The Southwestern itself is leased and worked by the Central of Georgia.

Besides this, 50 miles of the track laid on the Atlanta & Richmond Air Line are in Georgia, making the total of new road in that State 89 miles. This is an increase of 4½ per cent., and makes a total of 2,259 miles of railroad in Georgia.

## MISSISSIPPI.

**Natchez, Jackson & Columbus.**—Track has been laid from Natchez northeastward 7 miles. It is of 3½-foot gauge. This is an increase of about 0½ per cent. in the mileage of the State, making it now 997 miles. This road, or part of a road, is the only one of the gauge in the United States, we believe.

## TEXAS.

The railroads in this State are of dimensions somewhat proportional to those of the State, and all the lines named below are important ones. The one completed (Houston & Texas Central) gave the State its first and only connection with any railroad outside of the State, though it will soon have a second by the extension of the Cairo & Fulton to a connection with the Jefferson and Transcontinental divisions of the Texas & Pacific at Texarkana. The Texas & Pacific has laid more track than any other company in the United States in the year, and this State has a larger new mileage than any other.

**Galveston, Harrisburg & San Antonio.**—On the extension from the old terminus at Columbus, Texas, to San Antonio, 25 miles of track has been laid and the road opened for business to Schulenberg, 24 miles from Columbus, and 108 miles from Harrisburg, the eastern terminus.

**Houston & Texas Central.**—This railroad was completed early in the year by an extension from Van Alstyne northward 29 miles to Red River City, making the main line of the road 341 miles long, from Houston north to the Red River.

**International & Great Northern.**—The International Railroad (now called the International Division) was extended from Overton northeast 25 miles to a connection with the Texas & Pacific at Longview early in the year, and at the close of the year from the southwest terminus on the Brazos River southwest 15 miles. The Tyler Branch of this Division was extended from Troupe (38 miles southwest of Longview) north by west 44 miles to a connection with the Texas & Pacific at Mineola. This is a total of 84 miles constructed by this corporation.

**Texas & Pacific.**—The main line was completed from the old terminus at Longview west 122½ miles to a junction with the Houston & Texas Central at Dallas. The Jefferson Division was completed from Marshall north by east 75 miles through Jefferson to the Arkansas border at Texarkana. The Transcontinental Division was completed from a junction with the Houston & Texas Central at Sherman east 50 miles to a point 7 miles east of Honey Grove.

This is a total of 485½ miles of new railroad, an increase of 45 per cent., making the total in the State 1,563 miles.

## ARKANSAS.

**Cairo & Fulton.**—Extended from Little Rock southwest 126 miles to Fulton, making the line 285 miles from the Missouri border and connection with the St. Louis & Iron Mountain at Moark southwest diagonally across the State of Arkansas. There remains about 18 miles of track to lay to complete the road to the Texas border and the Texas & Pacific Railway at Texarkana.

**Little Rock & Fort Smith.**—Extended from Lewisburg northward 51½ miles along the north bank of the Arkansas to Clarksville, making the line 100½ miles long from Little Rock to Clarksville.

**Little Rock, Pine Bluff & New Orleans.**—Extended northward 55 miles to Pine Bluff, completing 74 miles of road, from the Mississippi at Chicot. It has been consolidated under the name of Texas, Mississippi River & Northwestern, with the

Mississippi, Ouachita & Red River, which has been extended westward 15 miles to Monticello, which is 36 miles west of the Mississippi River terminus at Chicot.

This is a total of 247½ miles, an increase of 55 per cent., which makes the length of railroad in the State 698 miles.

## TENNESSEE.

**Memphis & Raleigh.**—This road, of 3-foot gauge, was completed from Memphis northeastward 10 miles to Raleigh.

**Mississippi Central Extension.**—Completed from Jackson, Tenn., the northern terminus of the Mississippi Central, northward 103 miles to the Ohio River opposite Cairo. The road was built under the auspices and by the aid of the New Orleans, Jackson & Great Northern, the Mississippi Central and the Illinois Central, and with them forms a complete line from Chicago south to New Orleans, a distance of 909 miles. Of this line 63 miles is in Tennessee.

**Paducah & Memphis.**—From the southern terminus at Memphis this road was completed northeastward 37 miles to Covington, Tenn., and the old line was extended from Obion southward 4 miles to Trimble, which is 78 miles southwest of Paducah.

This is a total of 114 miles of new railroad, an increase of 7½ per cent., making the total length of railroad in Tennessee 1,634 miles.

## KENTUCKY.

**Elizabethtown & Paducah.**—Track has been laid from Cecilia Station, Ky., northward for 14 miles on the Louisville Extension, which will be 45.7 miles long, from Cecilia Station to Louisville. It is of 5-foot gauge.

In addition to this, 40 miles of the Mississippi Central Extension is in Kentucky. The new line is thus 54 miles, an increase of 4½ per cent., making the mileage of the State 1,320 miles.

## OHIO.

**Baltimore, Pittsburgh & Chicago.**—Completed from the Lake Erie Division of the Baltimore & Ohio at Centerton west by north 60 miles to the Dayton & Michigan at Deshler. This is the Baltimore & Ohio's Chicago line.

**Cleveland, Mount Vernon & Columbus.**—Completed by an extension from Centerton southwestward 31 miles to Columbus, making the line 145 miles long, from Hudson to Columbus.

**Mahoning Coal Railroad.**—Completed from a junction with the Ashtabula & Jamestown Branch of the Lake Shore & Michigan Southern at Andover southward 36 miles to Youngstown, all but the six miles next Youngstown in 1873.

**Marietta, Pittsburgh & Cleveland.**—Completed by an extension from Cambridge northward 39 miles to Canal Dover, making the whole line 97 miles long from Marietta northward. The road until recently was called the Marietta & Pittsburgh.

**Painesville & Youngstown.**—Extended from Chardon southward 10 miles to Burton, making it 22 miles long, from Painesville southward. It is of 3-foot gauge.

The total is 131 miles, which is an increase of 3¼ per cent. and makes the mileage of the State 4,239 miles. The Baltimore, Pittsburgh & Chicago is the beginning of a long line which is to give the Baltimore & Ohio an independent route into Chicago. The three next named are now completed and have good connections. The last named is built largely as a coal railroad and must be extended considerably before it can be very useful, but the road-bed is nearly or quite ready all the way to Youngstown.

## MICHIGAN.

**Chicago & Canada Southern.**—Completed from Blissfield Crossing on the Lake Shore & Michigan Southern (southwest from which 25 miles was completed in 1872) northeast 40 miles to Grosse Ile, opposite the western terminus of the Canada Southern. This makes the road 65 miles long from Grosse Ile, Mich., southwest to Fayette, O.

**Detroit & Bay City.**—This road was completed by an extension of 22 miles from Vassar northward to Bay City, which makes the road, from Detroit to Bay City, 110 miles long.

**Detroit, Lansing & Lake Michigan.**—The Ionia & Stanton Branch (leased from the Ionia, Stanton & Northern Company) was extended from Sheridan north 5½ miles to Stanton, making the branch 20 miles long, from the junction three miles west of Ionia to Stanton.

**Grand Rapids & Indiana.**—Extended northward from last year's terminus (which was 16 miles north of Fyle Lake) 54 miles to a terminus on Little Traverse Bay, to which the name Petoska has been given. This terminus is 194 miles northward from Grand Rapids.

**Jackson, Lansing & Saginaw.**—This division of the Michigan Central was extended from Otsego Lake north 8 miles to Barnes, making the length of the line from Jackson northward 236 miles.

**Mineral Range.**—Completed from Hancock to Calumet, 12½ miles, in the copper region of the Upper Peninsula. The road is of 3-foot gauge.

**Toledo, Canada Southern & Detroit.**—Completed by an extension from last year's terminus 25 miles northeast of Toledo, northeastward 40 miles to Detroit, making the line 65 miles long.

The total is 182 miles, an increase of 6½ per cent. in the mileage at the close of 1872, making the total length of railroad in the State now 3,071 miles.

The new work completes the Grand Rapids & Indiana, a north-and-south line through the whole length of the lower Peninsula on its west side, making a large part of it, which is heavily wooded, practically accessible for the first time; also the Detroit & Bay City, which gives a direct outlet to Detroit to the part of the Jackson, Lansing & Saginaw north of Saginaw Bay—another north-and-south line through the densely wooded northern part of the Peninsula, nearer to the Lake Huron side. The Chicago & Canada Southern is intended chiefly for through traffic between Chicago and the East. The Toledo, Canada Southern & Detroit serves simply as a feeder of the Canada Southern from Detroit and Toledo, being almost